Service
Service
Service

Service Manual

12 V

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COMPACT disc DIGITAL AUDIO

CLASS 1
LASER PRODUCT

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PHILIPS

SPECIFICATIONS

Power supply	:	13.2VDC (nom.)	Distortion	:	≤ 0.01% (at 1kHz)
	:	16.0VDC (max.)	Data - Track mute	:	≥ 93dB (A-weighted)
Frequency response	:	20-20,000 Hz (± 1dB)	Wow and flutter	:	unmeasurable
DAC resolution	:	1 bit per channel	Output voltage	:	700mV
Bus interface	:	D²B	Operating positions	:	Horizontal/Vertical/45°
Crosstalk L<>R	:	≤ -75dB	Weight	:	2 kg
S/N ratio	:	96dB (A-weighted)	Dimensions (HxWxD)	:	66 x 259 x 175 mm

SERVICE

IMPORTANT !! **!! IMPORTANT**

- When disassembling, ALWAYS protect the pick-up unit against ESD damage by closing the solder connection of the pick-up unit either on the CD panel or the flexible foil pcb!
  (See also the repair notes and disassembly procedures described in this manual.)
- New pick-up units are supplied with CLOSED solder connections on the flexible foil pcb.
  Do NOT forget to remove the solder connection AFTER replacing the unit!

SERVICE HINTS

- To prevent magazine check (duration approx. 30-40 sec.), insert the magazine and press the 'eject' button SIMULTANEOUSLY. In that case disc no.1 is loaded and the set comes into 'Standby' mode.
- Use (home-made) extension cables of approx. 30 cm to get access to the bottom side of the main pcb for measuring purposes. Two extension cables (a 2-pole and a 5-pole one) are required. To make these cables, the following parts can be ordered and used for making the extension cables:
  CS801 - cable assy 2-pole - 4822 321 62668
- CS802 - cable assy 5-pole - 4822 320 11738
- The set can also operate without cover, but take care of the following measures:
  - ABSOLUTELY NEVER PERMIT LASER BEAMS TO ENTER THE EYES
  - DO NOT EXPOSE THE SET TO BRIGHT (SUN)LIGHT
- When the CD changer has a defect while the magazine is still in, the magazine can be removed by moving the emergency eject lever to the right by a small screwdriver, as shown in figure 1 below. First the protection sheet has to be removed. DO NOT FORGET to put the sheet back, to prevent dust intrusion! When a disc is chucked, turn the gear to the right until the slide lever reaches to the edge of the left side (see figure 2).

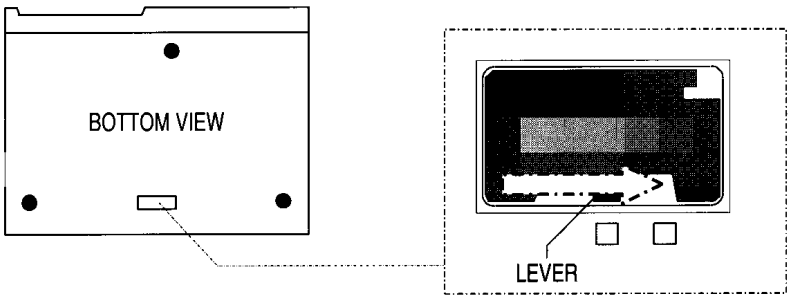


Figure 1

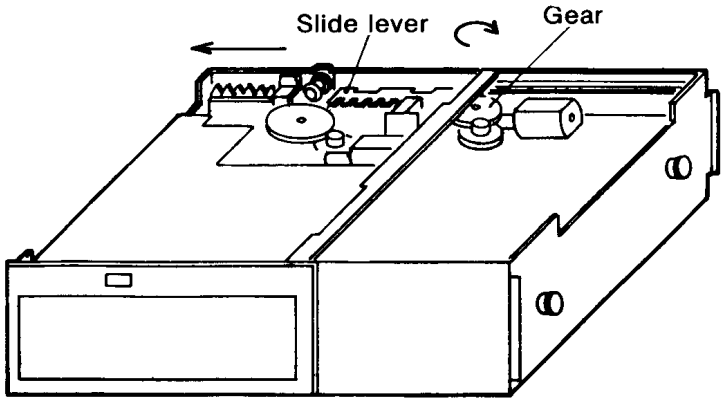
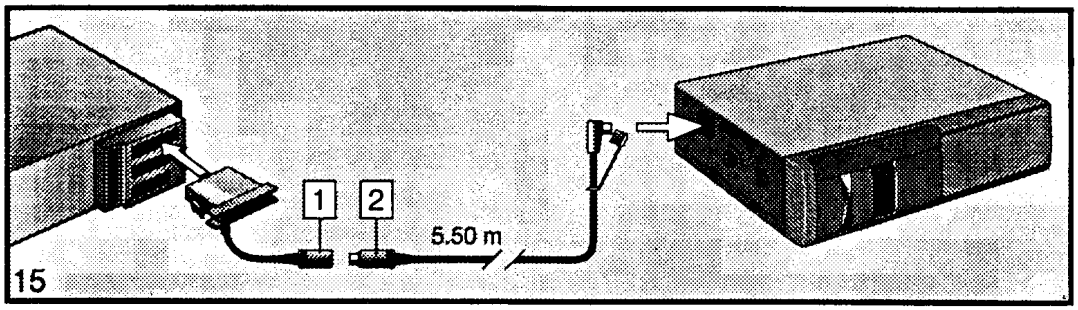


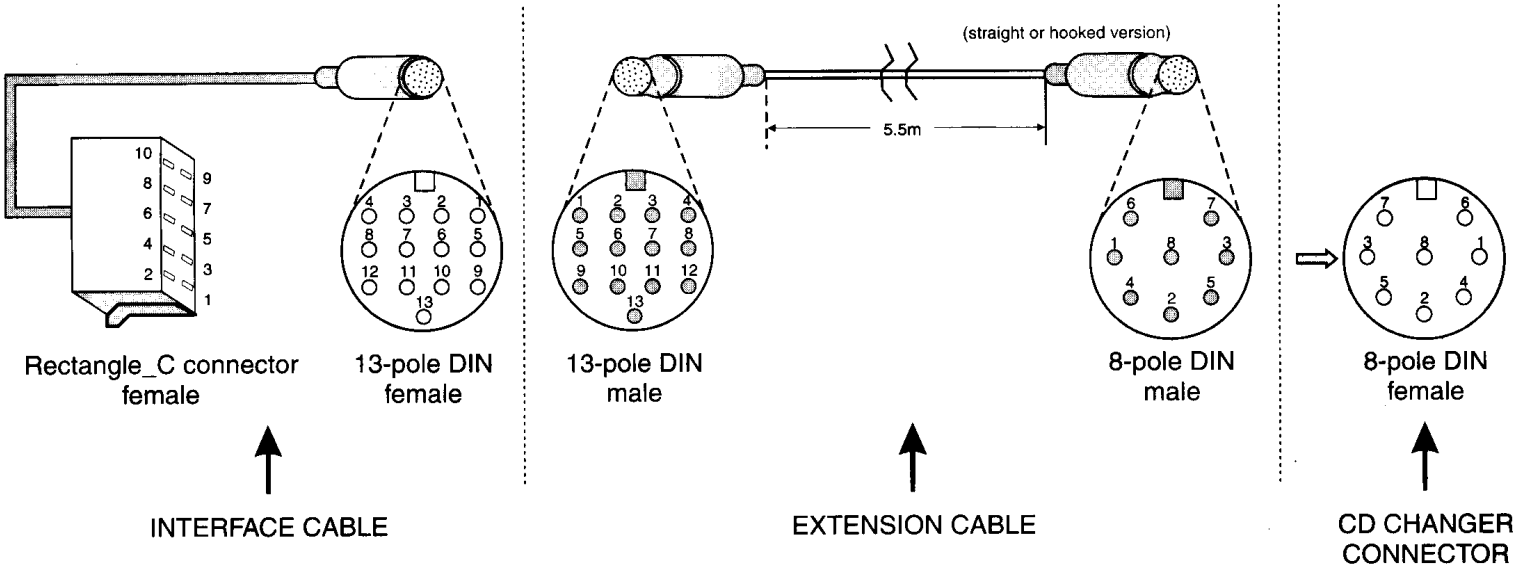
Figure 2

INTERFACE CABLE CONNECTIONS



INTERFACE CABLE CONNECTIONS (continued)

The figure below shows the pin layout of the connections of the interface cable (service 12nc: **4822 321 62263**) and the extension cable (service 12nc: **4822 321 62671**).
All connections here are seen from the *front* side of the connectors.



RECTANGLE_C CONNECTOR

Pin	Signal
1	BUS_GND
2	D²B +
3	D²B -
4	N.C.
5	+ 12V PERM.
6	GND
7	+ 12V SW.
8	R_CH
9	L_CH
10	SIGN_GND
(SHIELD)	(GND)

13-POLE DIN CONNECTOR

Pin	Signal
1	SIGN_GND
2	L_CH
3	SIGN_GND
4	R_CH
5	GND
6	N.C.
7	+ 12V SW.
8	+ 12V PERM.
9	BUS_GND
10	N.C.
11	D²B +
12	D²B -
13	N.C.
SHIELD	GND

8-POLE DIN CONNECTOR

Pin	Signal
1	+ 12V SW.
2	+ 12V PERM.
3	GND
4	D²B -
5	D²B +
6	R_CH
7	L_CH
8	SIGN_GND
SHIELD	GND

FUNCTIONAL EXPLANATION

FUNTIONAL EXPLANATION

1. APC (Auto laser power control)
   This is the circuit to control laser power of pickup, and laser ON/OFF is set by command from micro computer.

2. RF Amplifier (I pattern output)
   This inputs pickup photo diode output current (A+C) to FIN2 (1pin), and (B+D) to FIN1 (2pin). Input current is IV-converted, and output to RFSM (41pin) of RFSM amplifier output by way of AGC circuit. Self-contained AGC circuit has variable range of ±3dB, and the time constant can be varied by outside-fixed condenser of PH1 (60pin). This also controls bottom level of EFM signal (RFSM output), and this response can be varied by outside-fixed condenser of BH1 (61pin). Central gain of AGC variable range is set by resistance value between RFSM (41pin) and RFS-(42pin).

3. SLC (Slice level control)
   SLC makes duty of EFM signal which is input to DSP 50%. This judges duty, and decides DC level by integrating EFMO signal which is output from DSP.

4. Focus servo
   Focus error signal can be gained by detecting the difference between (A+C) and (B+D), which is (B+D)-(A+C), and it is sent to FE (20pin). Focus error signal gain is set by resistance value between FE (20pin) and FE-(21pin).
   FA amplifier is phase compensating Amplifier, and the equalizer curve is set by outside-fixed condenser and resistance. Besides, this amplifier has muting function.
   FD amplifier has the following functions; phase compensating circuit, focus search signal synthesis, and offset cancelling. Focus search starts by F-SERCH command, and generates lamp waveshape by inner clock. Focus error signal by this waveshape detects in-focus condition (focus zero cross), and turns on focus servo. Lamp waveshape amplitude is set by resistance between FD (16pin) and FD-(17pin).

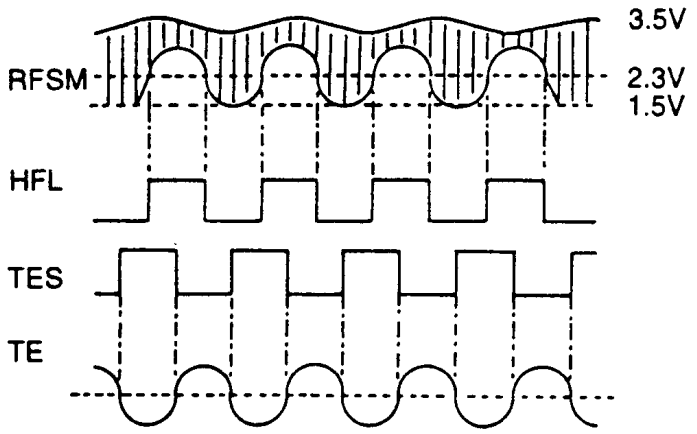
5. Tracking servo
   This inputs pickup photo diode output current to E (3pin) and F (4pin). Input current is IV-converted, and output to TE (7pin) by way of VCA circuit for balance adjustment and VCA circuit for follow-up to RFAGC circuit. Tracking error gain is set by resistance between TE-(6pin) and TE (7pin).
   TOFF amplifier just after TE (7pin) turns off servo by TOFF signal from DSP.
   TH amplifier varies servo response characteristic by TGL signal from DSP. or by THLD signal of inside formation by detecting JP signal. When DEFECT is detected, inside mode changes into THLD. This can be avoided by causing short circuit in DEF (49pin) to "L"=GND. In case of detection, gain can be automatically up by configulating outside DCI (9pin) band pass filter which picks up only shock element out of tracking error signals and putting it in.
   TO amplifier has the function of synthesizing JP pulse and cancelling tracking offset. JP pulse is set by JP (14pin) (THLD is detected inside).

6. Sled servo
   SLEQ (28pin) sets response characteristic. Amplifier after SLEQ (28pin) has muting function, and mutes SLOF (38pin) by "H" or SLED OFF command. Sled feed is operated by means of current input to SL-(30pin) and SL+(31pin), that is, by connecting to output port of micro computer by resistance and setting feeding gain by the resistance value.

7. Spindle servo
   This configurates, together with DSP, servo circuit to keep disc linear velocity at a scheduled level. This receives signal from DSP by CV-(39pin) and CV+(40pin), and sets equalizer characteristic by SP (23pin), SP-(36pin) and SPD (27pin) which output to SPD (27pin). SPG (25pin) is set by resistance with which amplifier gain of 12cm mode is connected to standard voltage.

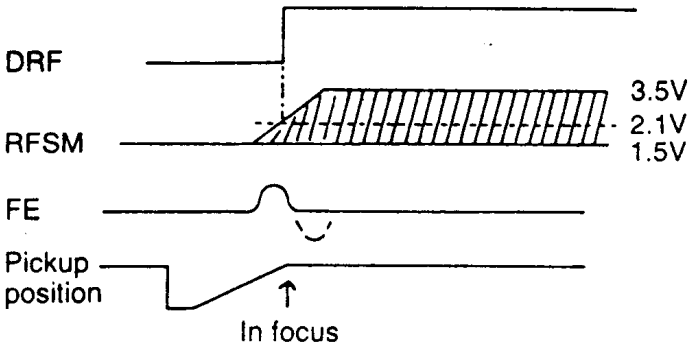
8. TES, HFL (Traverse signal)

In transferring pickup from inner track to outer track, EF output from pickup should be so connected that HFL and TES have phase relation as shown in the figure below. TES comparator has about ±100mV hysteresis at -polarity comparator against TESI input. To pickup exclusively necessary signals out of TE signals, band pass filter is configurated outside.



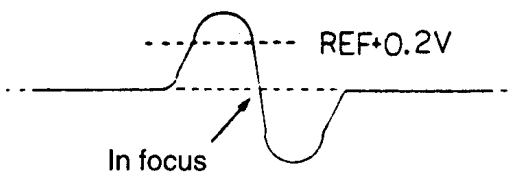
9. DRF (Beam level judgement)

DRF becomes "H", when EFM signal (RFSM output) is held at peak value by condenser of PH1 (60pin) and peak value of RFSM gets over 2.1V. Condenser of PH1 (60pin) is related to setting both DRF constant when detected and RFAGC response.



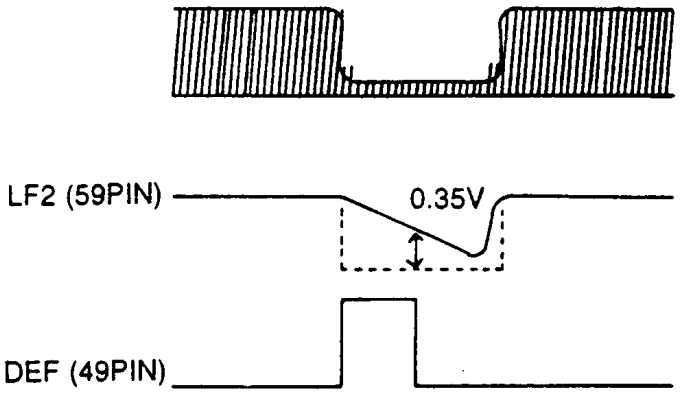
10. In-focus judgement

This detects DEF+0.2V of focus error signal S curve, and then judges focus zero cross (being in focus) when S curve becomes REF.



11. DEFECT

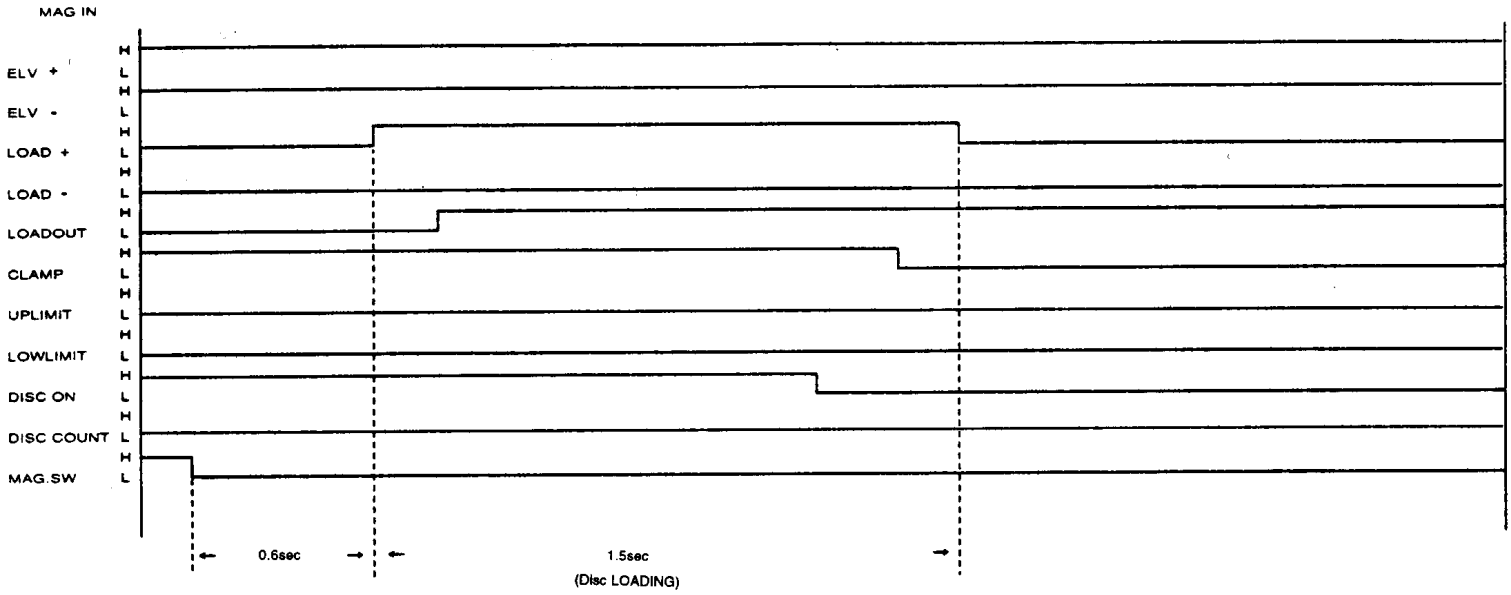
This normally maintain mirror surface level by condenser of LF2 (59pin), and when lack of EFM signal (RFSM output) gets over 0.35V, outputs "H" to DEF (49pin). When DEF (49pin) becomes "H", tracking servo changes into THLD mode.

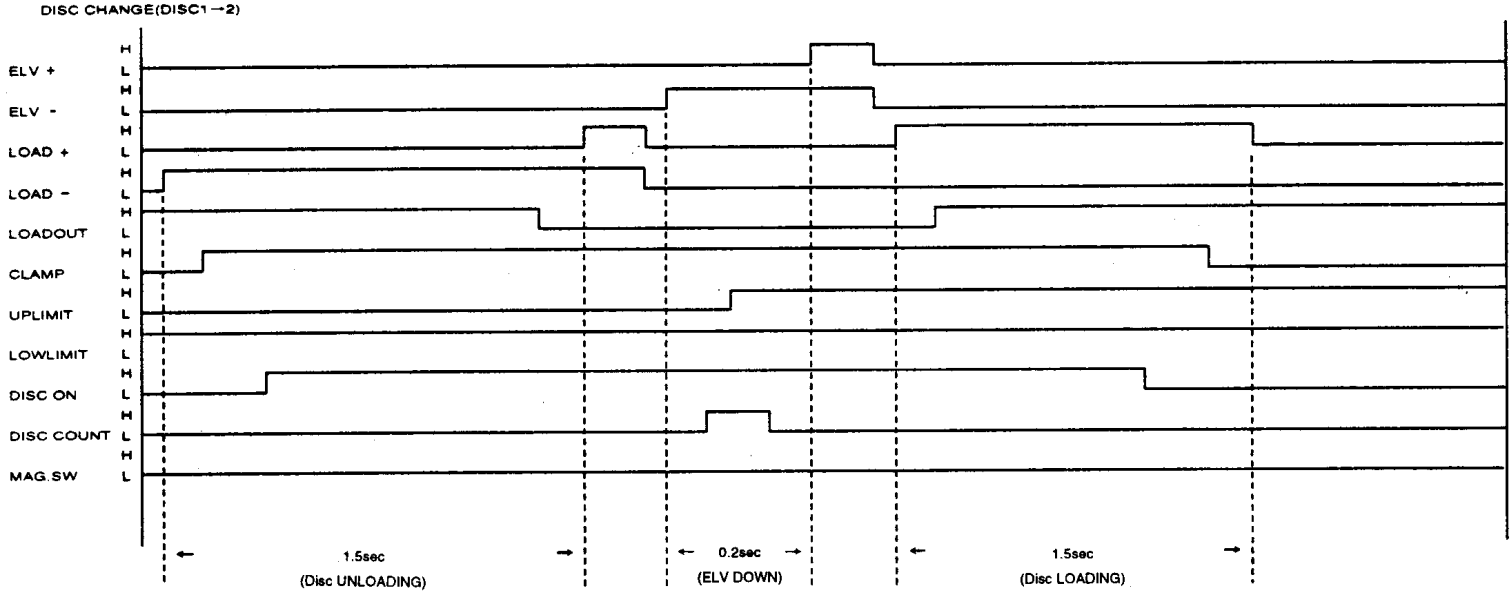


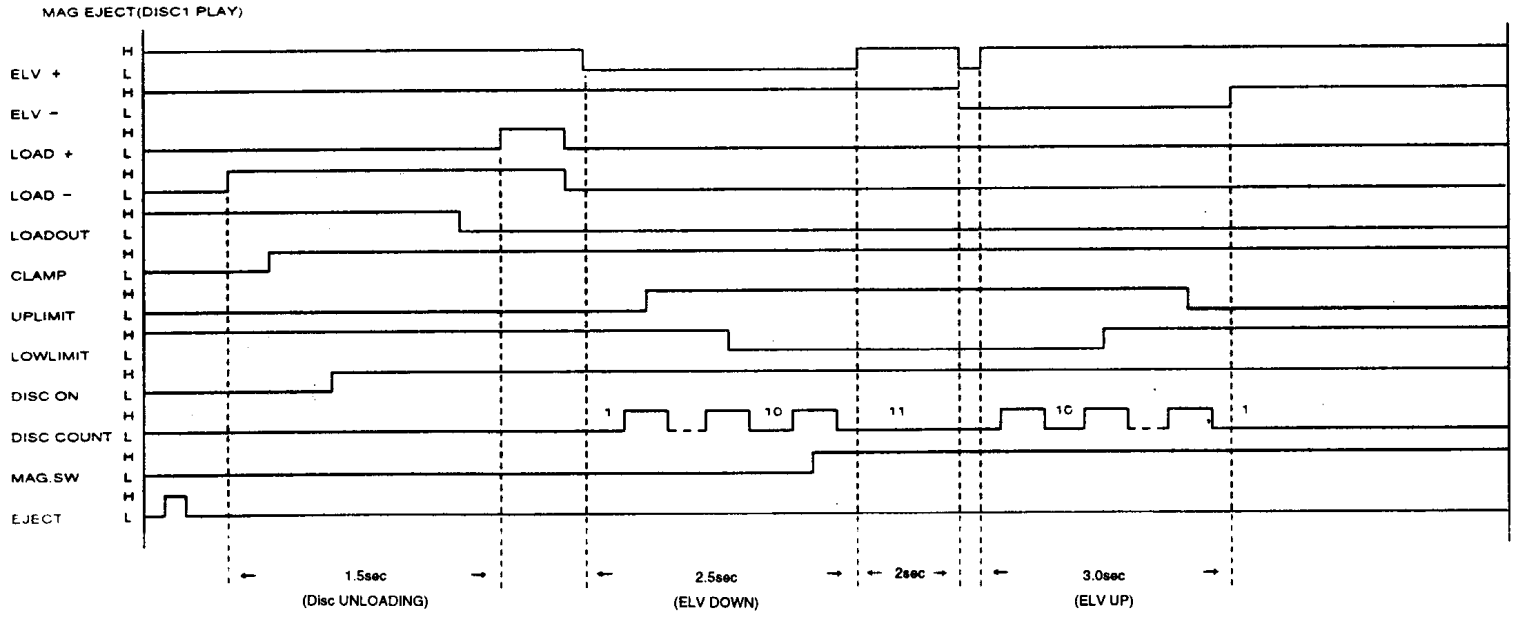
12. Reset circuit

When Vcc gets over about 2.8V, Power on Reset is cancelled.

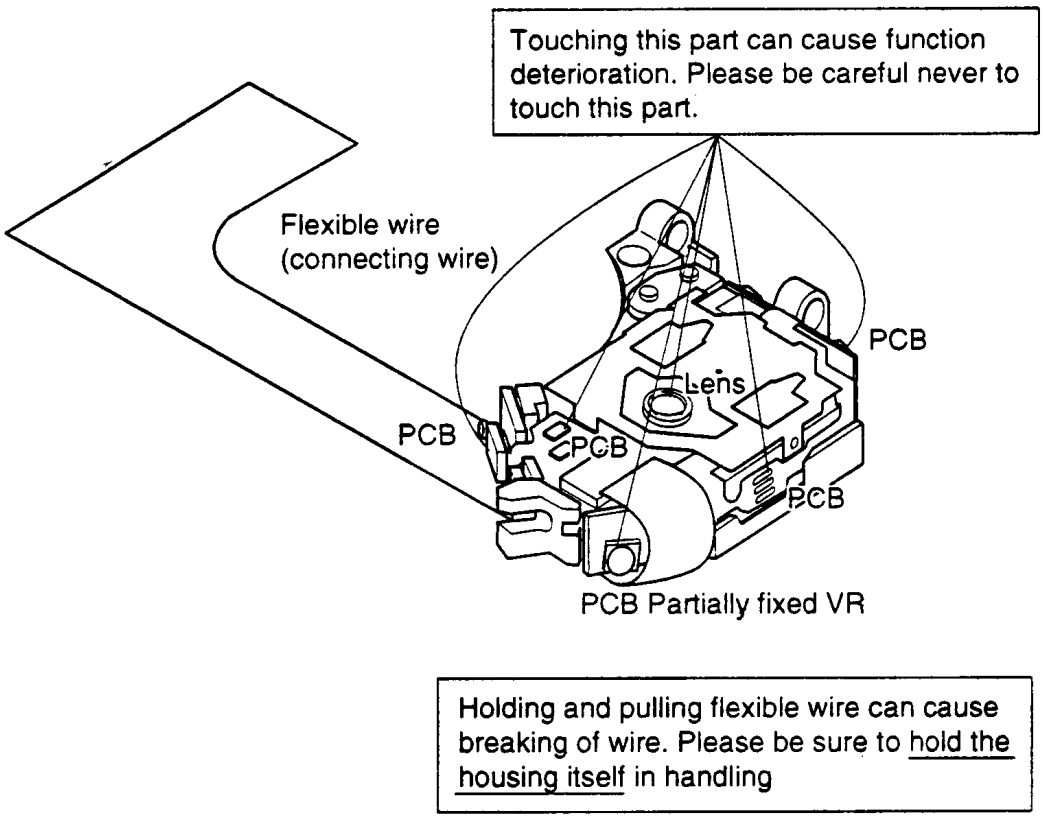
Mechanical Timing





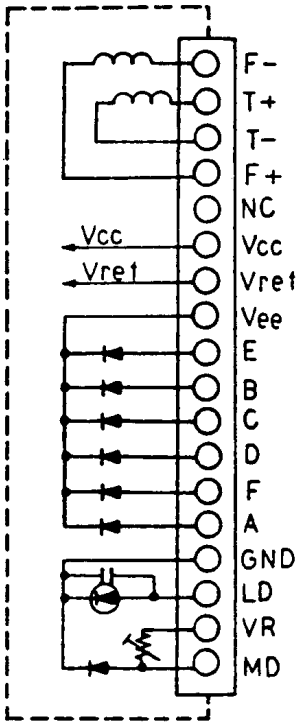


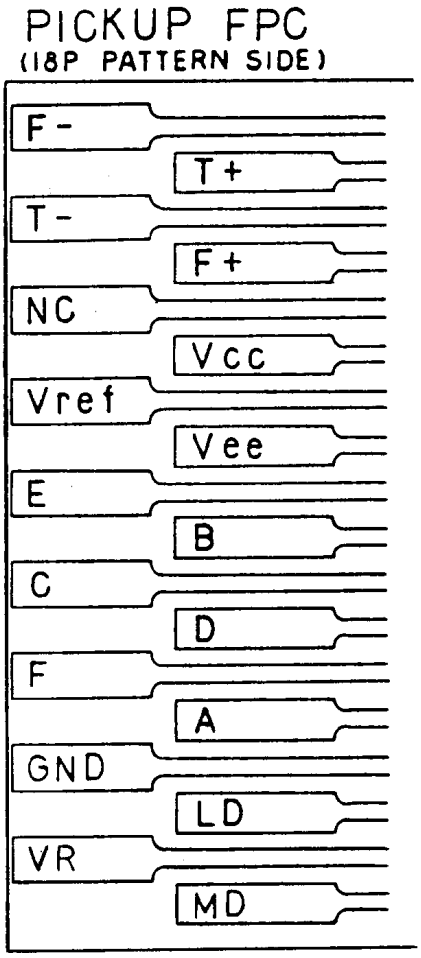
NOTES REGARDING HANDLING OF THE PICKUP



Holding and pulling flexible wire can cause breaking of wire. Please be sure to hold the housing itself in handling

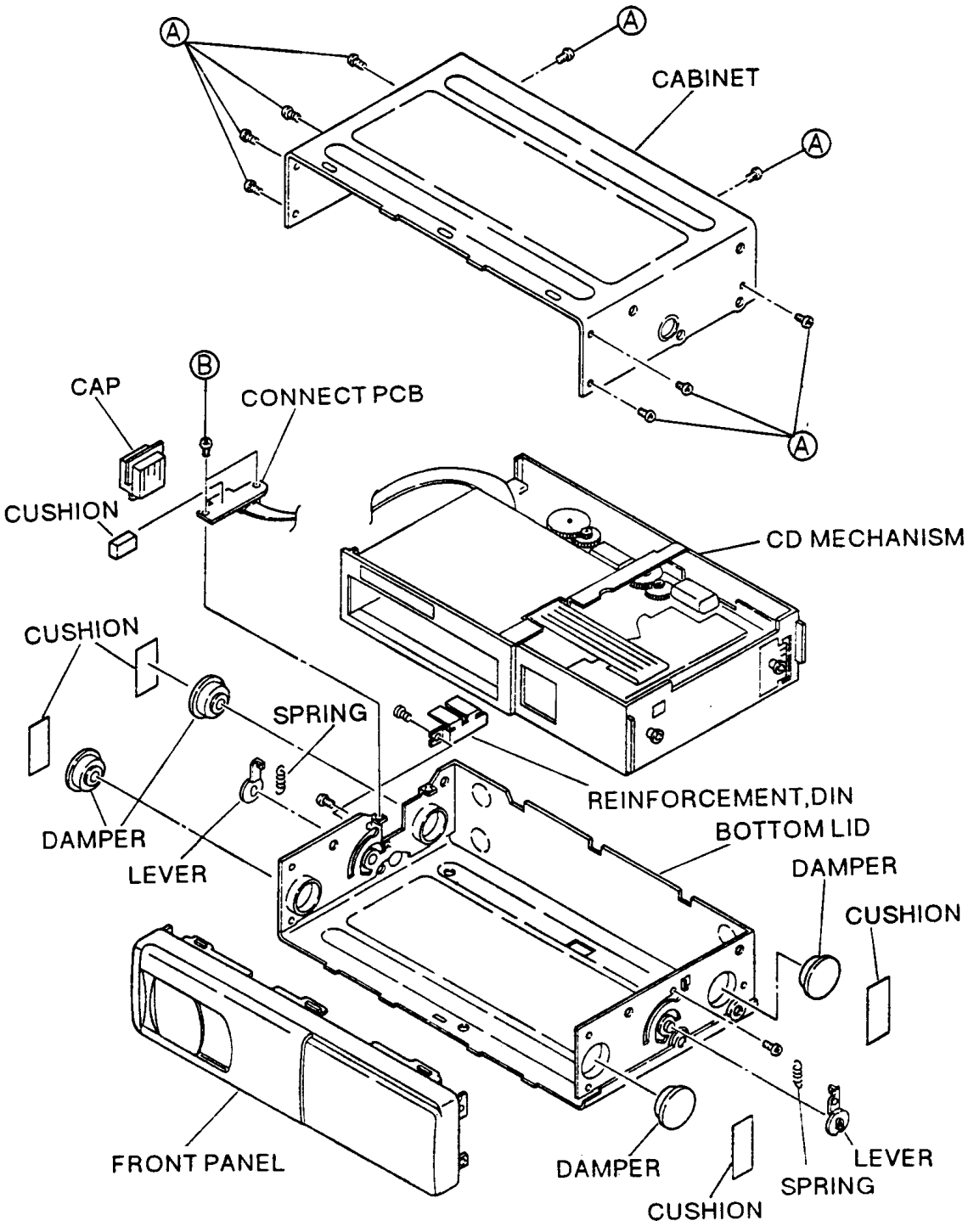
PICKUP DETAIL





DISASSEMBLY

1. Remove 9 screws Ⓐ securing the cabinet.
2. Remove the cabinet with pushing the front panel stopper.
3. Remove the front panel with pushing the both bottom lid stopper.
4. Remove 2 screws Ⓑ and the connector Ⓒ Connect P.C.B. can be removed.
5. Remove the cushion.
6. Remove the damper.
7. If remove the spring Ⓓ installed between the mechanism and the chassis, also mechanism can be removed.



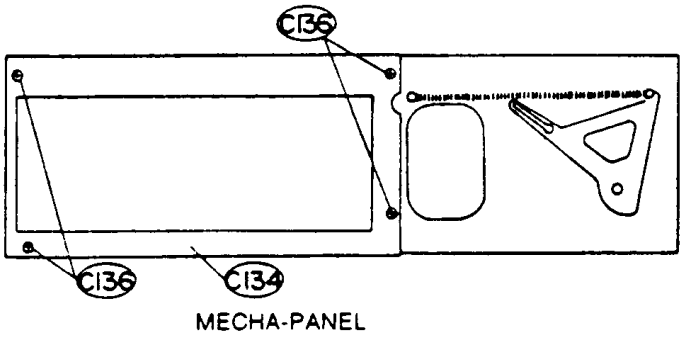
DISASSEMBLY

CD MECHANISM

1) How to remove the ELEVATOR MOTOR, FEED MOTOR and the LORDING MOTOR.

(1) How to remove the FEED MOTOR.

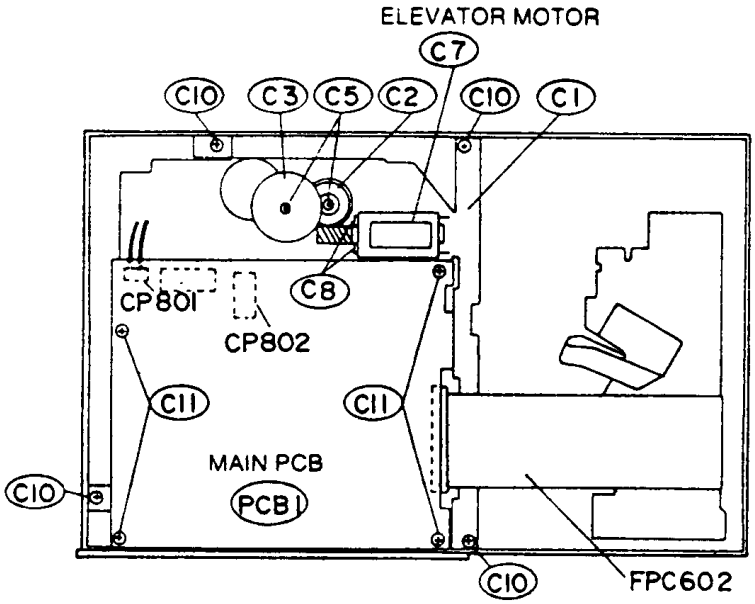
1. Short the short-pattern of FPC, PU (C99) with solder.
2. Remove the two screws (SCR S-TPG PAN PCS 2 ×3) (C136) which fasten the MECHA-PANEL (C134). The MECHA-PANEL can be removed.
3. Remove the four screw (SCR S-TPG PAN PCS 2× 4) (C11) which fasten the MAIN PCB (PCB1).
4. Remove the connectors (CP801 and CP802).
5. Only when you will also remove the ELEVATOR MOTOR, remove FPC602.
6. Remove the five screws (SCR TPG PAN PCS 2× 4) (C10) which fasten the TOP CHASSIS (C1). The TOP CHASSIS can be removed.
7. Remove the two screw (SCR S-TPG PAN PCS 2× 2.5) (C55) which fasten the FEED MOTOR (C54).



MECHA-PANEL

(2) How to remove the ELEVATOR MOTOR.

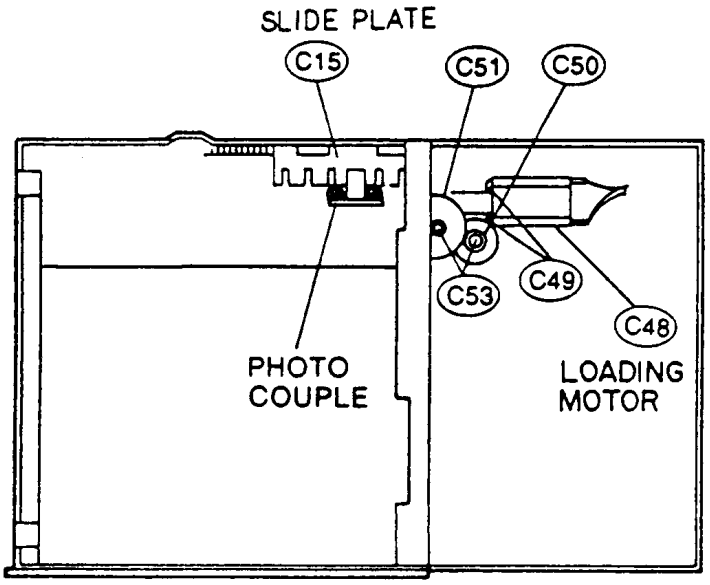
1. Remove the SPECIAL WASHER (C5) which fasten the GEAR A (C2) and the GEAR B (C3). The GEAR A and the GEAR B can be removed.
2. Remove the two screws (SCR S-TPG PAN PCS 2× 2.5) (C8) which fasten the ELEVATOR MOTOR (C7). The ELEVATOR MOTOR can be removed.



DISASSEMBLY

(3) How to remove the LOADING MOTOR.

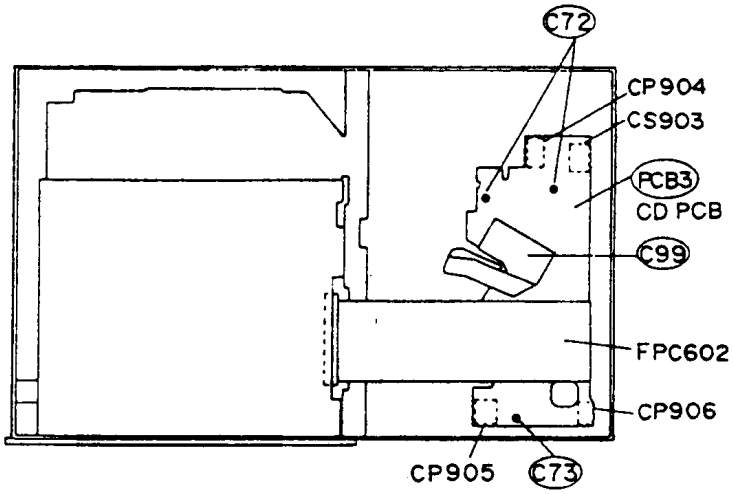
1. Remove the SPECIAL WASHER (C53) which fasten the GEAR LA (C50) and GEAR LB (C51) . The GEAR LA and GEAR LB can be removed.
2. Moving the slide plate C (C15) to the right, lower the elevator to the third slot position.
3. Remove the two screws (SCR S-TPG PAN PCS 2× 2.5) (C49) which fasten the LOADING MOTOR (C48) . The LOADING MOTOR can be removed.



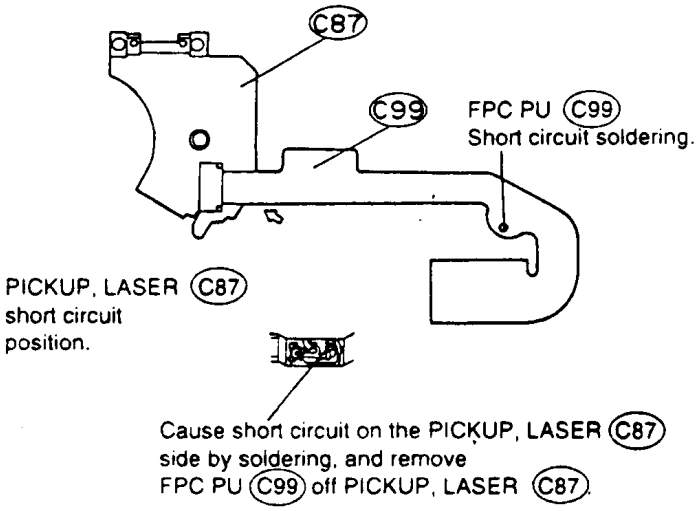
2) How to remove the PICKUP and the SPINDLE MOTOR.

(1) How to remove the CD PCB and PICKUP.

1. Short the short-pattern of FPC, PU (C99) with solder.
2. Remove CS903, FPC602, CP904, CP905 and CP906 from the connector.
3. Remove the two screws (SCR S-TPG PAN PCS 2× 4) (C72) and one screws (SCR S-TPG BIN 2×7) (C73) which fasten the CD PCB (PCB3).

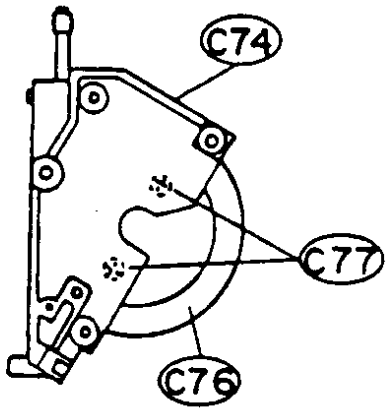


4. Remove the screw (SCR S-TPG BIN 2×7) (C79) which fix INSIDE SWITCH (C78) .
5. Remove the two screws (SCR PAN PCS 1.7×3.5) (C98) , and THRUST, SCREW (C96) , PLATE, SLIDE (C97) will come off.
6. Remove the two screws SPECIAL SCREW (C93) which fix SHAFT, PICKUP, A (C89) .
7. Remove the SHAFT, PICKUP, A (C89) from the PICKUP, LASER (C87) .
   The PICKUP, LASER (C87) can be removed.
8. Cause short circuit by soldering in PICKUP, LASER (C87) .
9. Remove FPC, PU (C99) off CONNECT, and CD P.C.B (PCB3) come off.

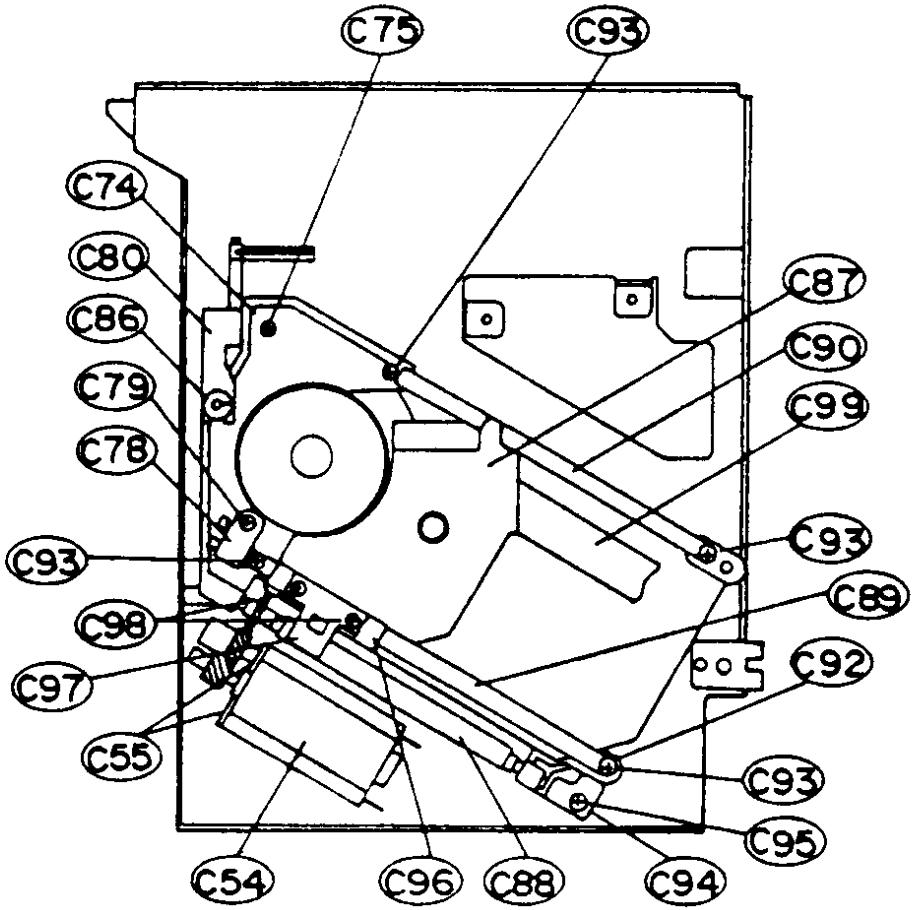


(2) How to remove the SPINDLE MOTOR.

1. Remove the screw (SCR S-TPG PAN PCS 2×4) (C95) which fix MOUNT-M, SCREW (C92) and SPRING, PLATE, SCREW (C94).
   Remove the ASSY, SHAFT, SCREW (C88).
2. Remove the two screws SPECIAL SCREW (C93) which fix SHAFT, PICKUP, B (C90).
3. Remove the screw (SCR S-TPG PAN PCS 2×4) (C75) which fix CHASSIS, SPINDLE (C74).
4. Remove SPECIAL WASHER (C86) which fix LEVER, DISC (C80).
5. Remove the screw (SCR PAN PCS 1.7×2.2) (C77), and SPINDLE MOTOR (C76) will come off.



SPINDLE MOTOR



FEED MOTOR

IC CIRCUIT DESCRIPTION

IC601 - LC78620E

Terminal Number	Terminal Code	I/O	Function Explanation	
1	DEFI	I	Defect detection signal (DEF) input terminal. (When unused, "L".)	
2	TAI	I	For PLL	Input terminal for testing. Pulldown resistance is self-contained.
3	PDO	O		Phase comparison output terminal for outer VCO control.
4	VVss			Power supply terminal for self-contained VCO. Normally 0V.
5	ISET	AI		Resistance connecting terminal for PDO output current adjustment.
6	VV_{DD}			Earthing terminal for self-contained VCO. Normally 5V.
7	FR	AI		For VCO range frequency adjustment.
8	Vss		Earthing terminal for digital system. Normally 0V.	
9	EFMO	O	For slice level control	EFM signal reverse output terminal.
10	$\overline{EFMO}$	O		EFM signal output terminal.
11	EFMIN	I		EFM signal input terminal.
12	TEST2	I	Input terminal for testing. Pulldown resistance is self-contained.	
13	CLV+	O	Output terminal for spindle servo control. Accelelates when CLV+ is "H", slows down when CLV- "H".	
14	CLV-	O		
15	V/P	O	Output terminal for automatic switchover monitor by rough servo / phase control. "H" causes rough servo, "L" phase control mode.	
16	FOCS	O	Output terminal for focus servo on/off. "L" causes focus servo ON.	
17	FST	O	Output terminal for focus start pulse. Open drain output.	
18	$\overline{FZD}$	I	Input terminal for focus error zero cross signal. (When unused, "L".)	
19	HFL	I	Input terminal for track detecting signal. Schmidt input.	
20	TES	I	Input terminal for tracking error signal. Schmidt input.	
21	PCK	O	Clock monitoring terminal for EFM data playback. At the time of phase lock, 4.3218MHz.	
22	FSEQ	O	Output terminal for synchronous signal detection. When synchronous signal detected from EFM signal and synchronous signal occurring inside correspond, "H".	
23	TOFF	O	Output terminal for tracking OFF.	
24	TGL	O	Output terminal for tracking gain switchover. "L" raises gain.	
25	THLD	O	Output terminal for tracking hold.	
26	TESTS	O	Output terminal for testing. Pulldown resistance is self-contained.	
27	V_{DD}		Power supply terminal for digital system. Normally 5V.	
28	JP+	O	Output terminal for track jump. When JP+ is "H", accelerates at the time of outer track direction jump, or slows down at the time of inner track direction jump. When JP- is "H", accelerates at the time of inner track direction jump, or slows down at the time of outer track direction. 3 value output is possible by command.	
29	JP–	O		
30	DEMO	I	Input terminal for sound turn-on function at the time of set adjustment process. Pulldown resistance is self-containd.	
31	TEST4	I	Input terminal for testing. Pulldown resistance is self-containd.	
32	EMPH	O	Output terminal for deemphasis monitor. At the time of "H", deemphasis disc is in playback.	
33	LRCKO	O	Digital filter output.	Word clock output.
34	DFORO	O		RCH data output.
35	DFOLO	O		LCH data output.
36	DACKO	O		Bit clock output.
37	TESTIO	O	Output terminal for testing. Open (Normally "L" output).	
38	USDACK	I	Anti-shock correspondence input. (Unused, "L".)	Bit clock input.
39	USDFIN	I		LRch data.

IC601 - LC78620E (CONT'D)

40	USDFIR	I	Anti-shock correspondence	Input terminal for testing. Normally "L".
41	USLRCK	I	input. (unused, "L".)	Word clock output. (When unused, "L".)
42	LRSY	O	ROMXA correspondence input	L/R clock output.
43	CK2	O		Bit clock output. DACLK (At the time of RES) Polarity reverse (CK2CON mode)
44	ROMAX	O		Data output. Data (Supplement) (At the time of RES) ROMOUT (ROMXA mode)
45	C2F	O		C2 Frag output.
46	MUTEL	O	For 1bit DAC	Mute output terminal.
47	LV_{DD}			Power supply terminal for L channel. Normally 5V.
48	LCHP	O		L channel P output terminal.
49	LCHN	O		L channel N output terminal.
50	LVss			Earthing terminal for L channel. Normally 0V.
51	RVss			Earthing terminal for R channel. Normally 0V.
52	RCHN	O		R channel N output terminal.
53	RCHP	O		R channel P output terminal.
54	RV_{DD}			Earthing terminal for R channel. Normally 5V.
55	MUTER	O		Mute output terminal.
56	DOUT	O	Digital OUT output terminal.	
57	SBSY	O	Output terminal for synchronous signal of sub-code block.	
58	EFLG	O	Terminal for monitoring C1, C2, single, double correction.	
59	PW	O	Output terminal for sub-code P, Q, R, S, T, U, W.	
60	SFSY	O	Output terminal for synchronous signal of sub-code frame. When sub-code is in standby, " = L ".	
61	SBCK	I	Input terminal for sub-code readout clock. Schmidt input.	
62	FSX	O	Output terminal for 7.35KHz synchronous signal which is divided frequency from crystal oscillation.	
63	WRQ	O	Output terminal for sub-code Q output standby.	
64	RWC	I	Input terminal for read/write control.	
65	SQOUT	O	Sub-code Q output terminal.	
66	$\overline{COIN}$	I	Input terminal for command from micro computer.	
67	CQCK	I	Input terminal for command input intake clock, or sub- code offtake clock from SQOUT. Schmidt input.	
68	$\overline{RES}$	I	Chip reset input terminal. When power is supplied, changeover to "L" once.	
69	TST11	O	Input terminal for testing. Open (normally "L" output).	
70	$\overline{LASER}$	O	Output terminal for laser ON/OFF. Controls by serial data command from micro computer.	
71	16M	O	16.9344MHz output terminal. But outputs 33.8688MHz, only in case of quadruple speed playback mode.	
72	4.2M	O	4.2336MHz output terminal.	
73	CONT	O	Spare output terminal. Controls by serial data command from micro computer.	
74	TEST5	I	Input terminal for testing. Pulldown resistance is self-contained.	
75	CS	I	Chip select input terminal. Pulldown resistance is self-contained.	
76	XVss		Earthing terminal for crystal oscillation. Normally 0V.	
77	X_{IN}	I	Connecting terminal for 16.9344MHz crystal oscillator.	
78	X_{OT}	O	Connects 33.8688MHz crystal oscillator, in case of quadruple speed playback system.	
79	XV_{DD}		Power supply terminal for crystal oscillation. Normally 5V.	
80	TEST1	I	Input terminal for testing. Pulldown resistance is self-contained.	

IC CIRCUIT DESCRIPTION

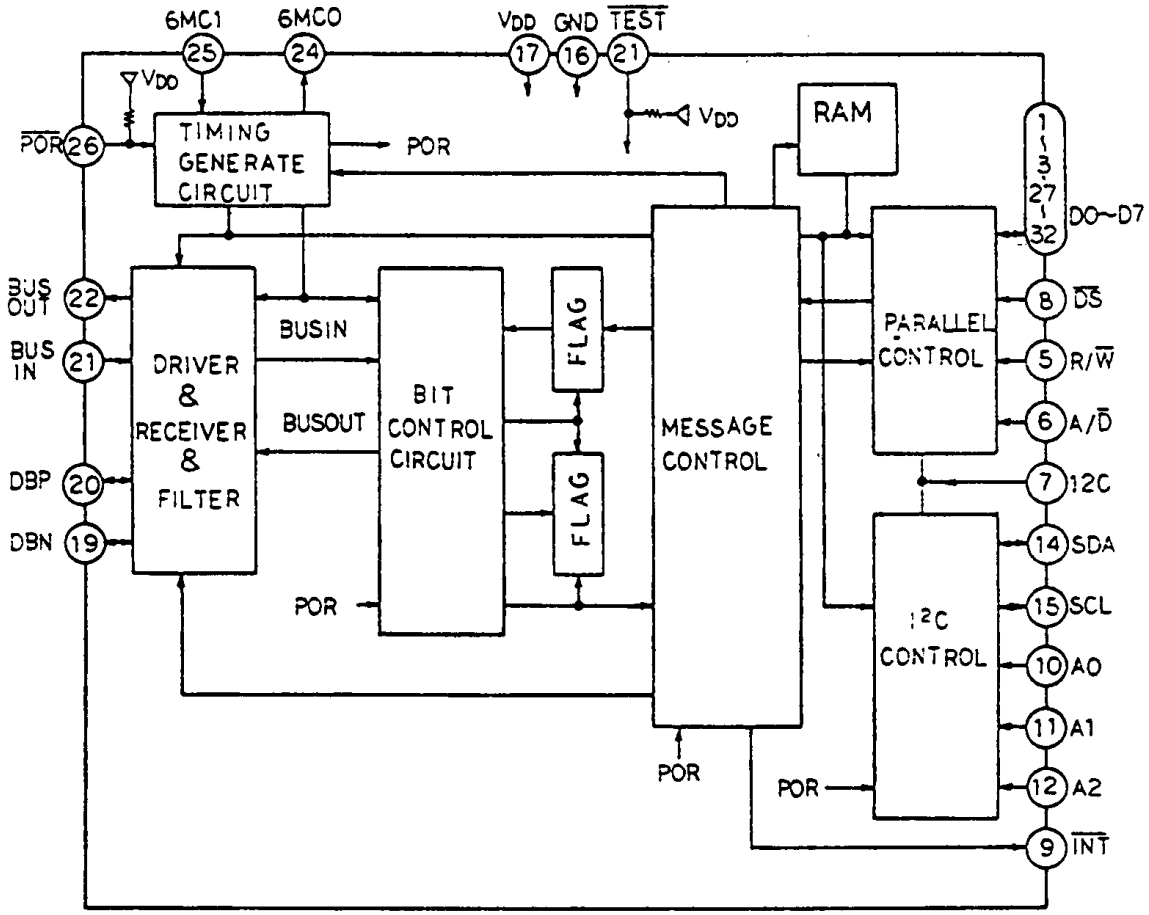
IC851 - MSM6307GS

No	Port Name	I/O	Description
1	D5	I/O	8bit bi-directional address or data bus
2	D6	I/O	8bit bi-directional address or data bus
3	D7	I/O	8bit bi-directional address or data bus
4	N. C	—	
5	R/$\overline{W}$	I	Read/Write selector
6	A/$\overline{D}$	I	Selects address or data on D0-D7
7	I^2C	I	Selects I^2C or parallel inteface
8	$\overline{DS}$	I	Data storobe to access data bus
9	$\overline{INT}$	O	Interrupt output
10	A0	I	Programmables I^2C slave addresses
11	A1	I	Programmables I^2C slave addresses
12	A2	I	Programmables I^2C slave addresses
13	N. C	—	
14	SDA	I/O	I^2C data signal input/output
15	SCL	I/O	I^2C clock signal input/output
16	GND	—	GND

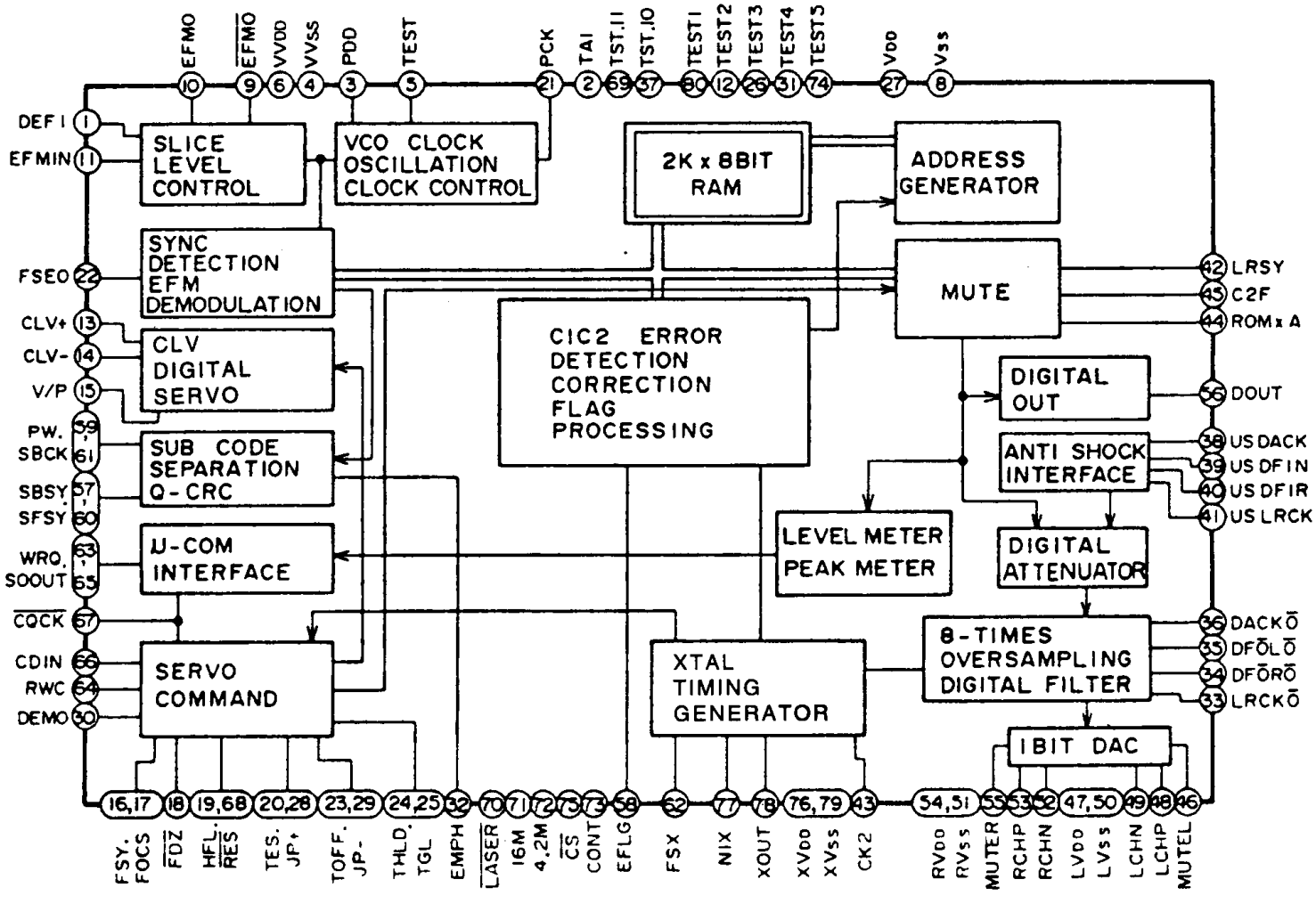
No	Port Name	I/O	Description
17	VDD	—	VDD (+5V)
18	N. C	—	
19	DBN	I/O	Differential D^2B lines of the intemal driver/receiver
20	DBP	I/O	Differential D^2B lines of the intemal driver/receiver
21	$\overline{TEST}$	I	Test mode of IC
22	BUS OUT	O	D^2B output (TTL level)
23	BUS IN	I	D^2B input (TTL level)
24	6CMO	O	Clock output 6MHz resonator
25	6CMI	I	Clock input 6MHz resonatore
26	$\overline{POR}$	I	Power on reset
27	D0	I/O	8bit bi-directional address or data bus
28	N. C	—	
29	D1	I/O	8bit bi-directional address or data bus
30	D2	I/O	8bit bi-directional address or data bus
31	D3	I/O	8bit bi-directional address or data bus
32	D4	I/O	8bit bi-directional address or data bus

IC CIRCUIT BLOCK DIAGRAM

IC851 - MSM6307GS



IC601 - LC78620E

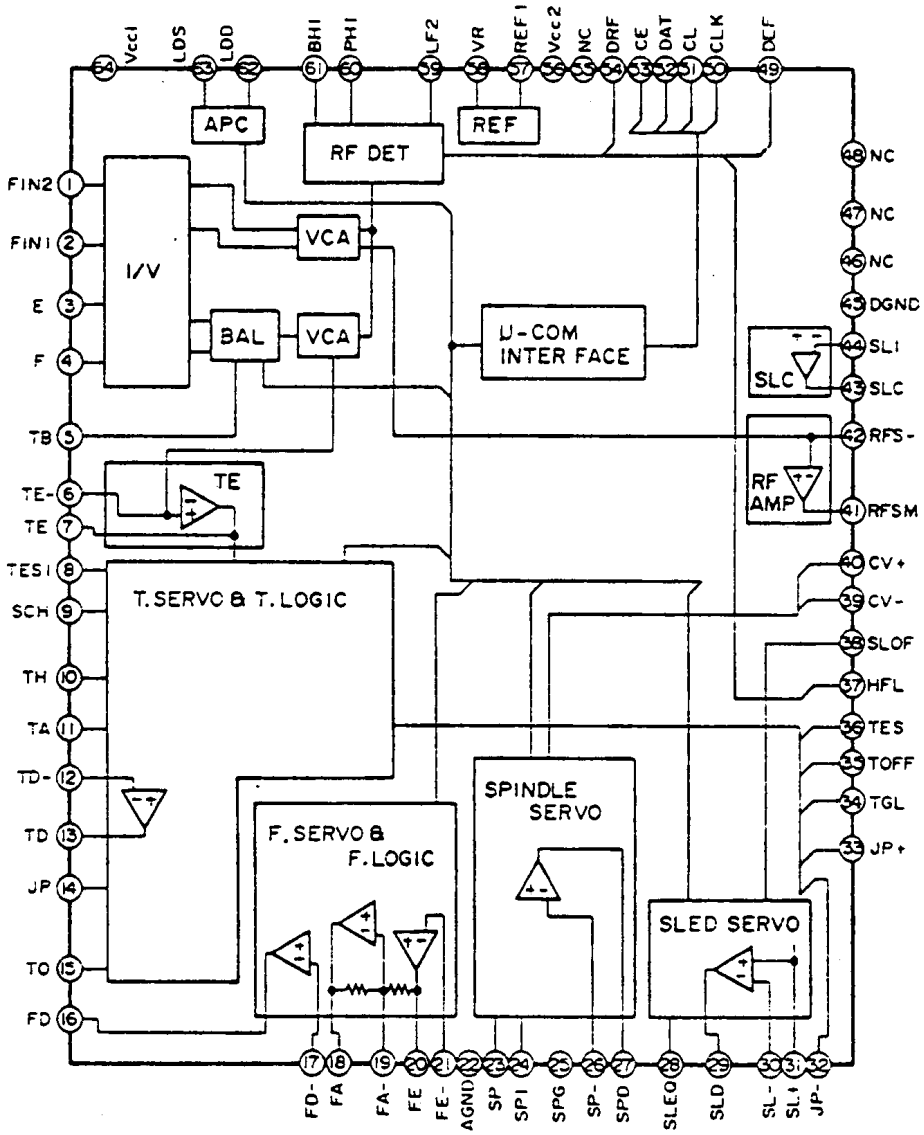


IC CIRCUIT DESCRIPTION

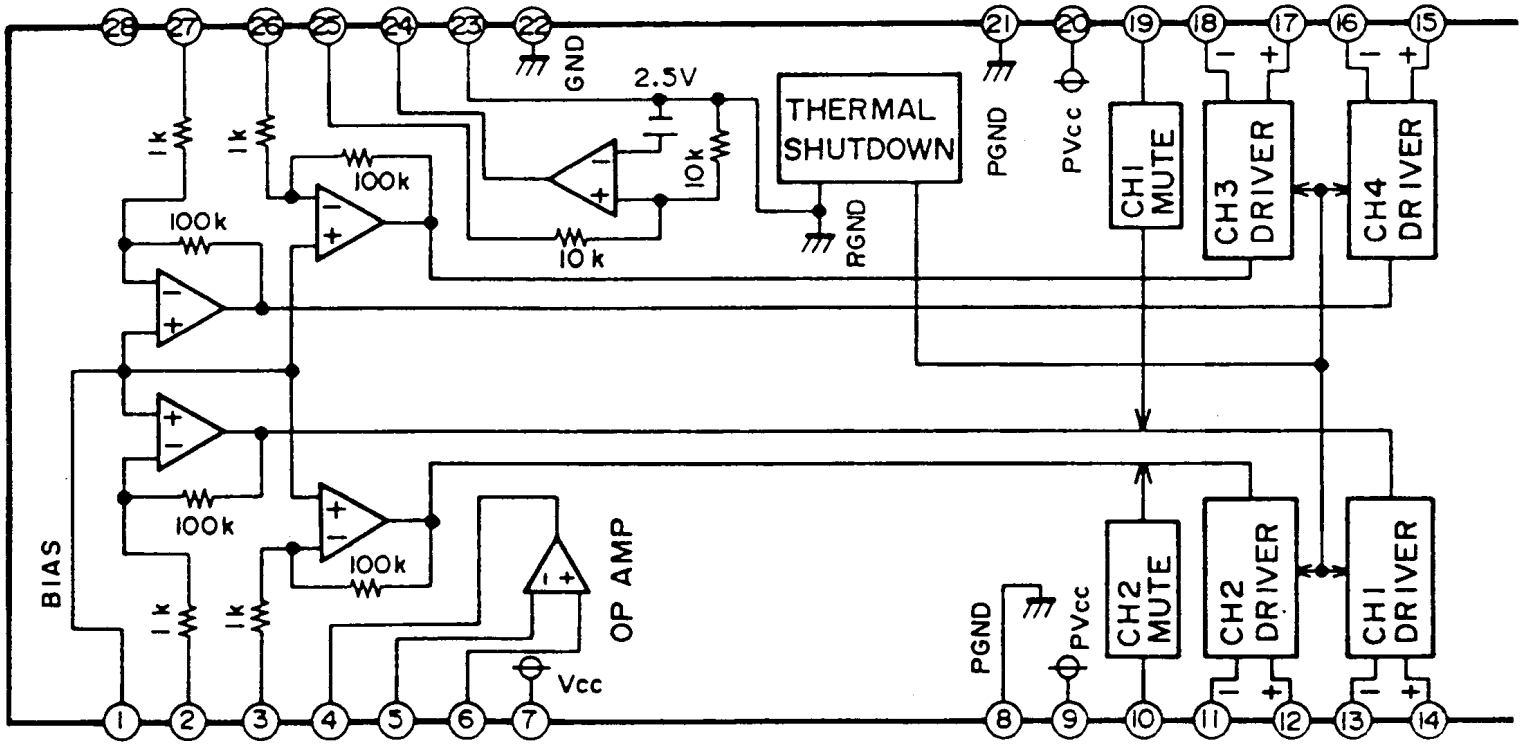
IC650 - LA9240MS

PIN No.	PART NAME	EXPLANATION
1	FIN2	Pickup photo-diode connecting pin. Forms RF signal by addition to FIN1 pin, and FE signal by subtraction.
2	FIN1	Pickup photo-diode connecting pin.
3	E	Pickup photo-diode connecting pin. Forms TE signal by subtraction from F pin.
4	F	Pickup photo-diode connecting pin.
5	TB	Pin for inputting DC constituent of TE signal.
6	TE-	Pin for connecting gain setting resistence of TE signal to TE pin.
7	TE	TE signal output pin.
8	TESI	TES (TRACK ERROR SENCE) comparator input pin. Band Pass TE signal, and input.
9	SCI	Input pin for shock detection.
10	TH	Constant setting pin at the time of tracking gain.
11	TA	Pin for connecting high pass elimination condensor of servo.
12	TD-	Pin for constituting tracking phase compensation constant between TD and VR pin.
13	TD	Pin for setting tracking phase compensation.
14	JP	Pin for setting tracking jump signal (kick pulse) amplitude.
15	TO	Tracking control signal output pin.
16	FD	Focusing control signal output pin.
17	FD-	Pin for constituting focussing phase compensation constant between FD and FA pin.
18	FA	Pin for constituting focussing phase compensation constant between FA- and FE- pin.
19	FA-	Pin for constituting focussing phase compensation constant between FA and FE pin.
20	FE	FE signal output pin.
21	FE-	Pin for connecting FE signal gain setting resistance to TE pin.
22	AGND	GND for analog signal.
23	SP	Single end output of CV+ and CV- pin input signal.
24	SPI	Spindle amplifier input.
25	SPG	Connecting pin for gain setting resistance at the time of spindle 12cm mode.
26	SP-	Connecting pin for Spindle phase compensation constant together with SPD pin.
27	SPD	Spindle control signal output pin.
28	SLEQ	Connecting pin for sled phase compensation constant.
29	SLD	Sled control signal output pin.
30	SL-	Input pin for sled delivery signal from micro computer.
31	SL+	Input pin for sled delivery signal from micro computer.
32	JP-	Input pin for tracking jump signal from DSP.
33	JP+	Input pin for tracking jump signal from DSP.
34	TGL	Input pin for tracking gain control signal from DSP. Gain low in case of TGL="H".
35	TOFF	Input pin for tracking off control signal from DSP. Off in case of TOFF="H".
36	TES	Output pin of TES signal to DSP.
37	HFL	(HIGH FREQENCY LEVEL) is used to judge whether main beam is located above pit or above mirror
38	SLOF	Sled servo off control input pin.
39	CV-	Input pin for CLV error signal from DSP.
40	CV+	Input pin for CLV error signal from DSP.
41	RFSM	RF output pin.
42	RFS-	Pin for setting RF gain and EFM signal 3T compensation constant together with RFSM pin.
43	SLC	(SLICE LEVEL CONTROL) is output pin for controlling data slice level by RF waveshape DSP.
44	SLI	Input pin for controlling data slice level by DSP.
45	DGND	GND pin of digital system.
46	FSC	For Focs Smoosing capacita output pin.
47	TBC	Tracking Balance control pin.
48	NC	NO CONNECT.
49	DEF	Output pin for detecting disc defect.
50	CLK	Standard clock input pin. DSP4.23MHz is input.
51	CL	Micro computer command clock input pin.
52	DAT	Micro computer command data input pin.
53	CE	Micro computer command chip enable input pin.
54	DRF	(DEFECT RF) RF level detecting output.
55	FSS	Focs serch select pin.
56	VCC2	VCC pin for servo system and digital system.
57	REF1	Connection pin for standard voltage capacitor.
58	VR	Standard voltage output pin.
59	LF2	Pin for setting constant at the time of detecting disc defect.
60	PH1	Pin for connecting condensor for RF signal peak hold.
61	BH1	Pin for connecting condensor for RF signal bottom hold.
62	LDD	APC circuit output pin.
63	LDS	APC circuit input pin.
64	VCC1	RF system VCC pin.

IC650 - LA9240MS



IC651 - BA6999FP



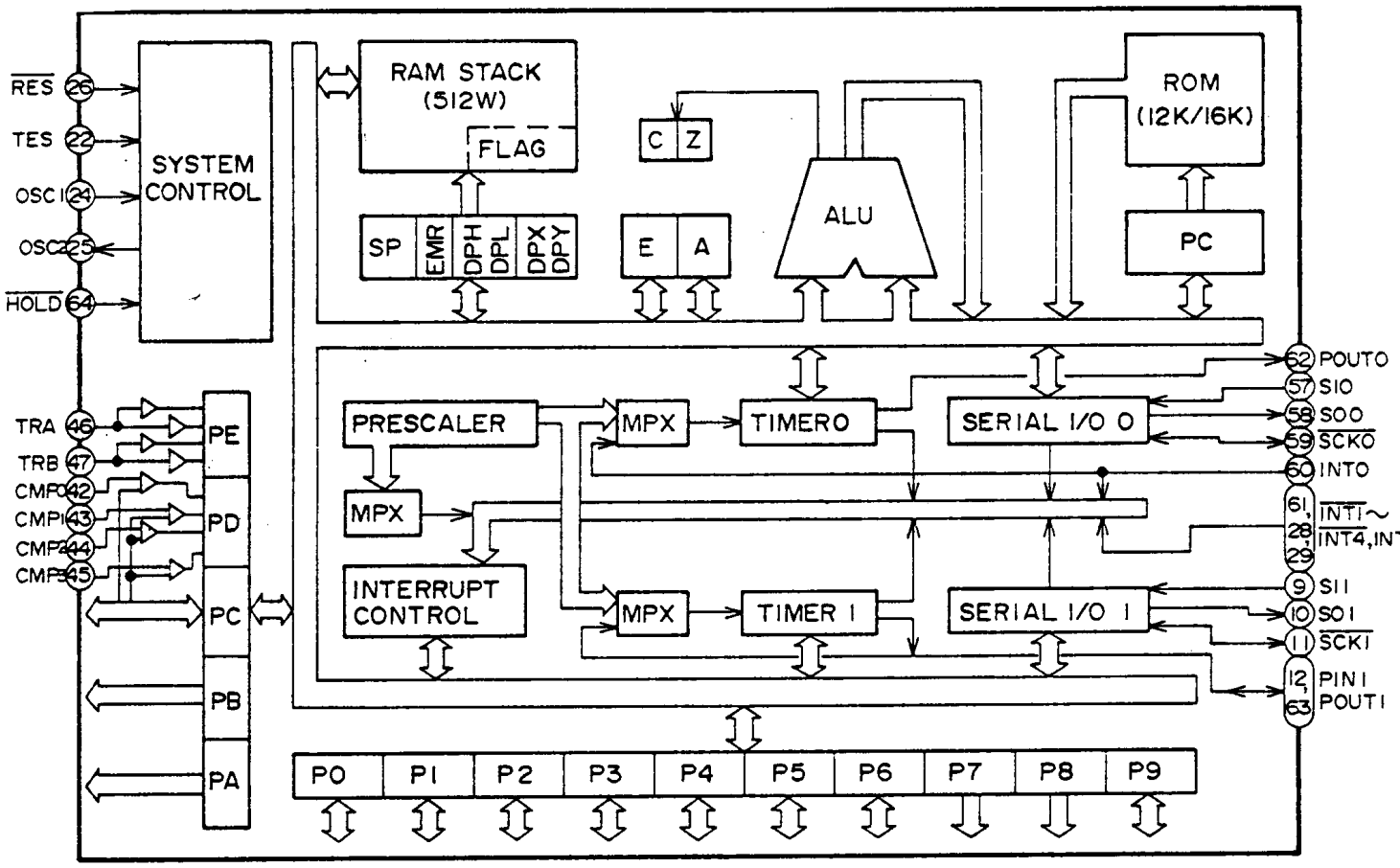
IC CIRCUIT BLOCK DIAGRAM

IC801 - LC66566B

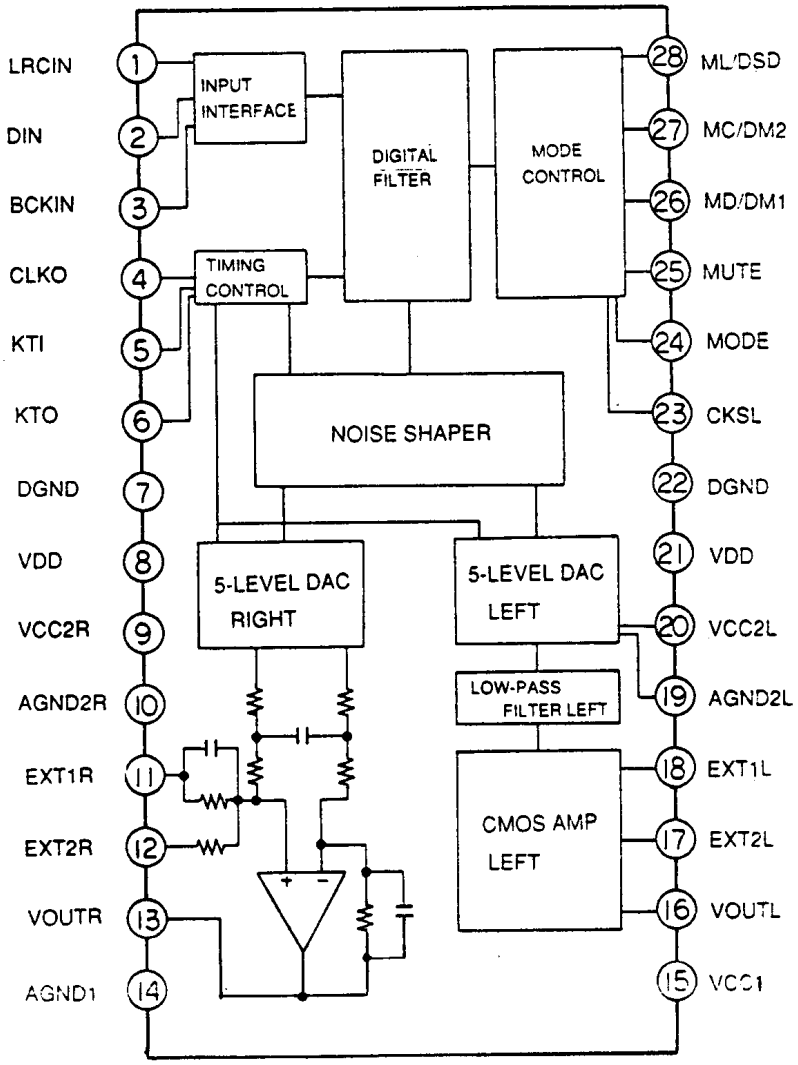
PIN NO	PORT NAME	I/O	DESCRIPTION	
1	D7	I/O	8bit bi-directional address or data bus	D2B
2	D6	I/O	8bit bi-directional address or data bus	D2B
3	D5	I/O	8bit bi-directional address or data bus	D2B
4	D4	I/O	8bit bi-directional address or data bus	D2B
5	D3	I/O	8bit bi-directional address or data bus	D2B
6	D2	I/O	8bit bi-directional address or data bus	D2B
7	D1	I/O	8bit bi-directional address or data bus	D2B
8	D0	I/O	8bit bi-directional address or data bus	D2B
9	CLAMP	I	Disc clamp finish SW input	
10	UP	I	Elevator upper limit SW input	
11	LOW	I	Elevator lower limit SW input	
12	MAG.SW	I	Magazine detection SW input	
13	$\overline{DS}$	O	Data strobe to access data bus	D2B
14	A/$\overline{D}$	O	Selects address or data on D0~D7	D2B
15	R/$\overline{W}$	O	Read/Write selector	D2B
16	N.C	O	No connection	
17	N.C	O	No connection	
18	N.C	O	No connection	
19	N.C	O	No connection	
20	N.C	O	No connection	
21	$\overline{INT}$	I	Interrupt input	D2B
22	TEST	I	Connection to ground	
23	VSS	—	Ground	
24	OSC1	I	Ceramic oscillator connection terminal for system clock	
25	OSC2	O	Ceramic oscillator connection terminal for system clock	
26	$\overline{RESET}$	I	Reset signal input terminal	
27	BATT	I	Battery LOW detection input terminal	
28	N.C	O	No connection	
29	N.C	O	No connection	
30	POWER	O	Main power supply ON/OFF output terminal	
31	N.C	O	No connection	
32	ELV-	O	Elevator moving-down output signal	
33	ELV+	O	Elevator moving-up output signal	
34	FEM-	O	Pickup moving-inside ouput signal	
35	FEM+	O	Pickup moving-outside output signal	
36	LOAD+	O	Output to move a tray in the direction out of magazine with loading motor	
37	LOAD-	O	Output to move a tray in the direction back to magazine with loading motor	
38	N.C	O	No connection	
39	N.C	O	No connection	
40	VR0	I	Reference voltage for TH1	
41	VR1	I	Reference voltage for TH2	
42	TH1	I	Temperature sensor ON input signal	
43	TH2	I	Temperature sensor OFF input signal	
44	ACC	I	ACC ON/OFF detection input	
45	D.ON	I	Disc detection Photo transistor input terminal	
46	EJECT	I	Magazine eject key input terminal	
47	DRF	I	Focus OK signal input terminal	
48	N.C	O	No connection	
49	DISC.C	I	Elevator position detection pulse input	
50	6/10CD	I	Initial setting input terminal for 6discs or 10discs changer switching	
51	MUTE	O	Mute output terminal	
52	DSRST	O	Reset signal for DSP(LC78620E) output terminal	
53	LOADO	I	Magazine tray detection SW input	
54	INSIDE	I	Inner circle limit detection SW input	
55	N.C	O	No connection	
56	VDD	—	Power supply terminal(+5V)	
57	SQOUT	I	Interface with DSP(LC78620E)	
58	COIN	O	Interface with DSP(LC78620E)	
59	CQCK	O	Interface with DSP(LC78620E)	
60	WRQ	I	Interface with DSP(LC78620E)	
61	N.C	O	No connection	
62	RWC	O	Interface with DSP(LC78620E)	
63	N.C	O	No connection	
64	STBY	I	Stand by position cancellation input terminal	

IC CIRCUIT BLOCK DIAGRAM

IC801 - LC66566B

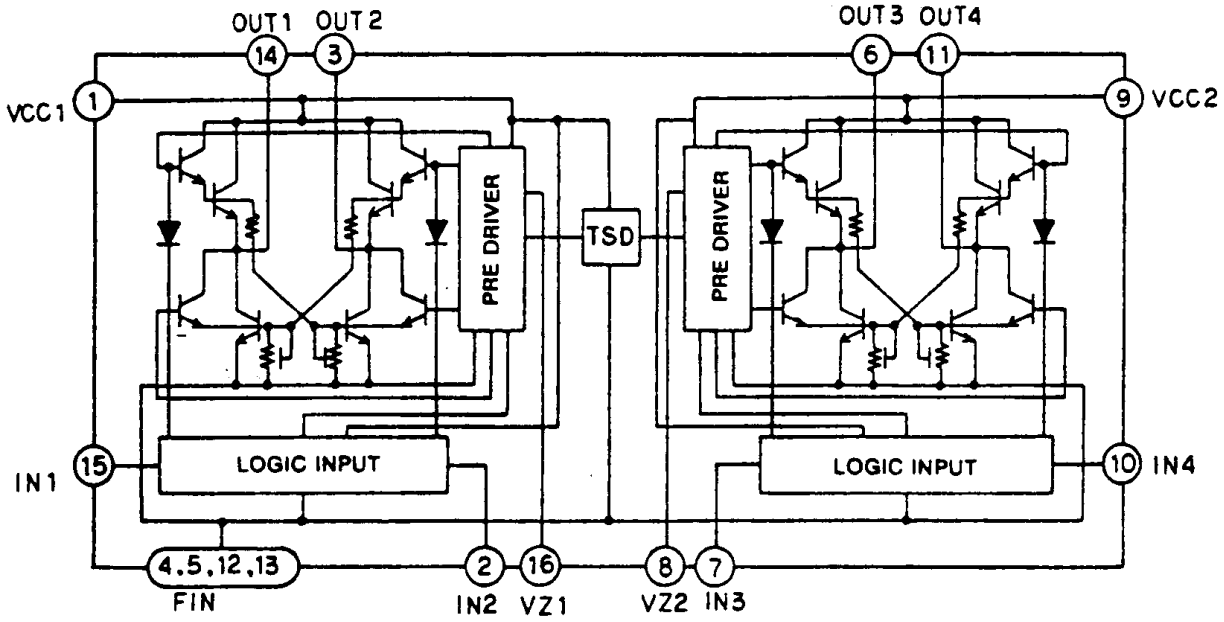


IC701 - PCM1710U

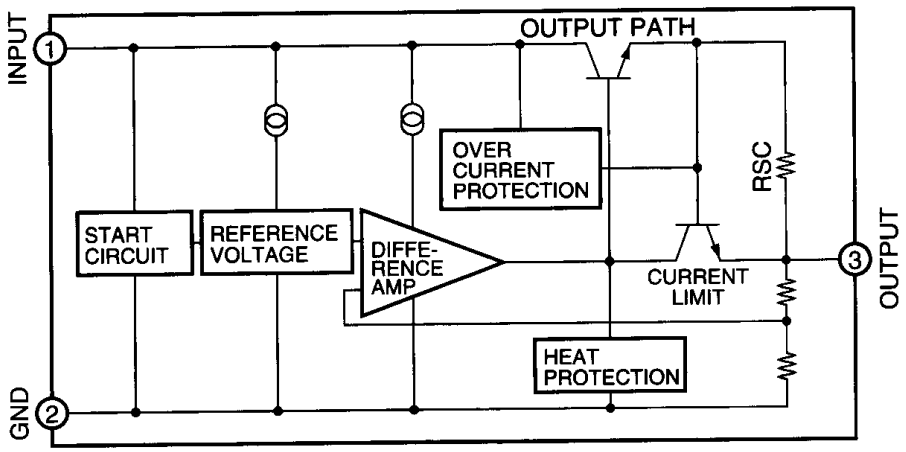


IC CIRCUIT BLOCK DIAGRAM

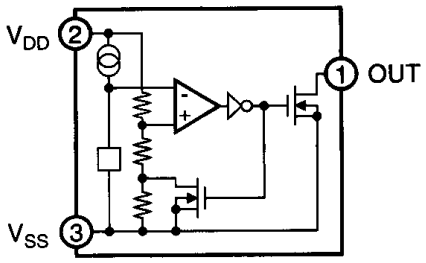
IC850 - LB1644



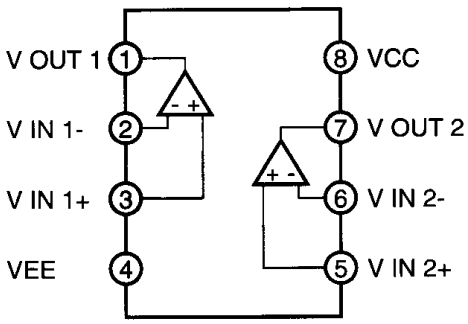
IC501 - MCM7805 / IC551 - L78M05T



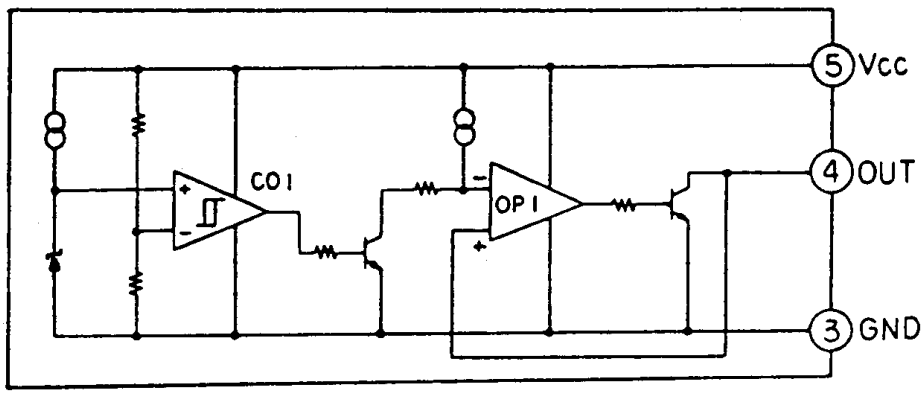
IC802 - S-8054HN



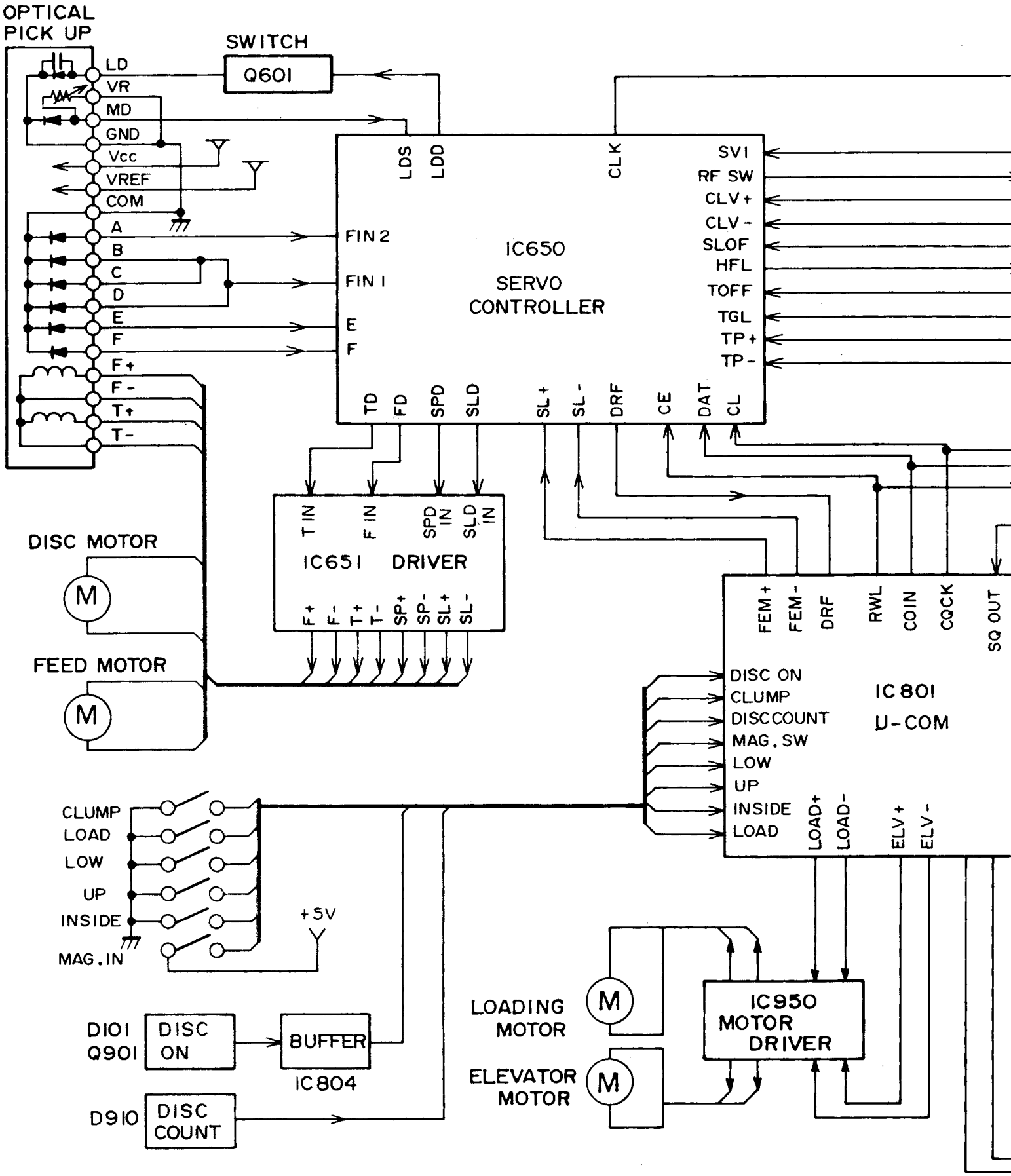
IC702 - NJM2100M



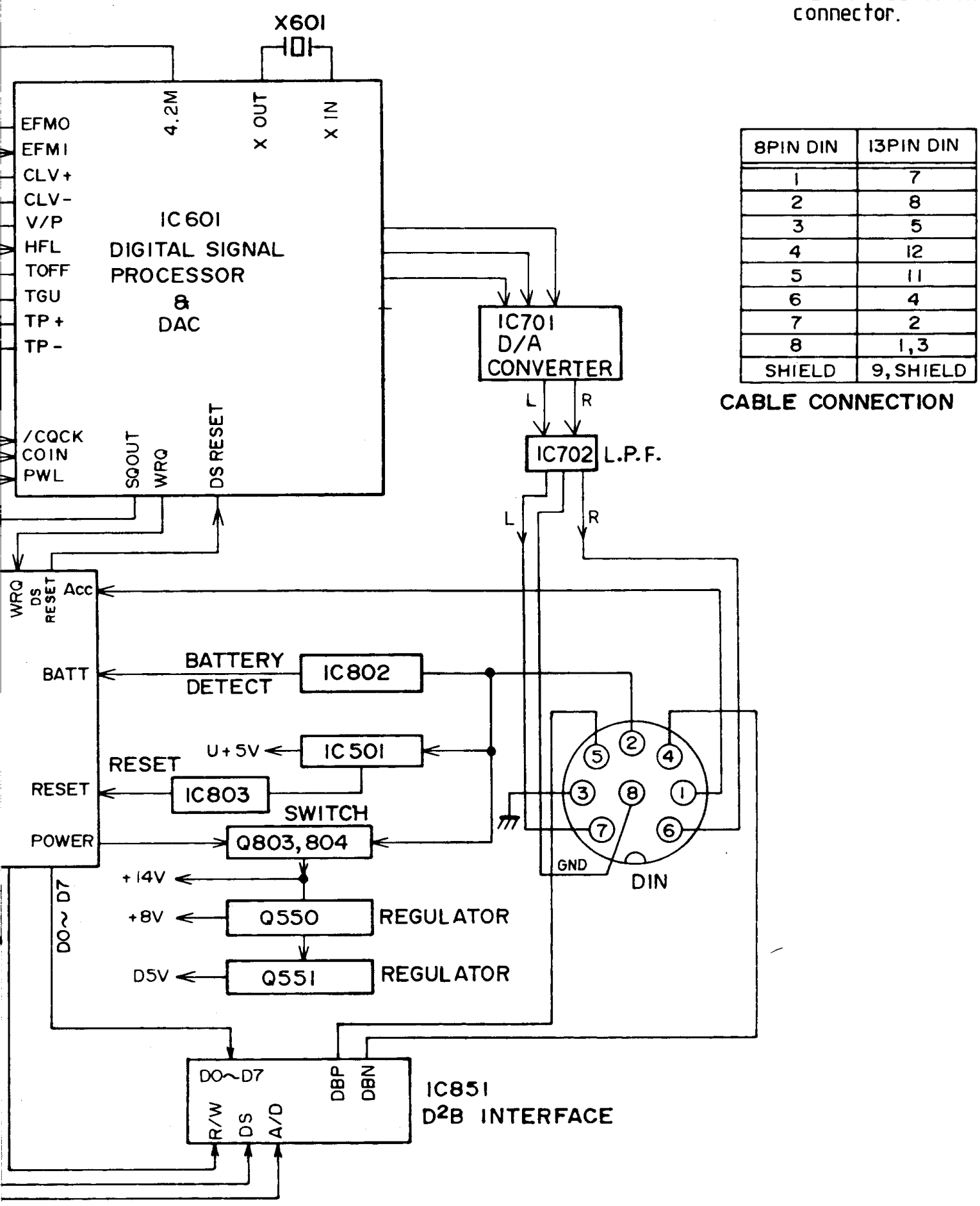
IC803 - PST9138N



BLOCK DIAGRAM



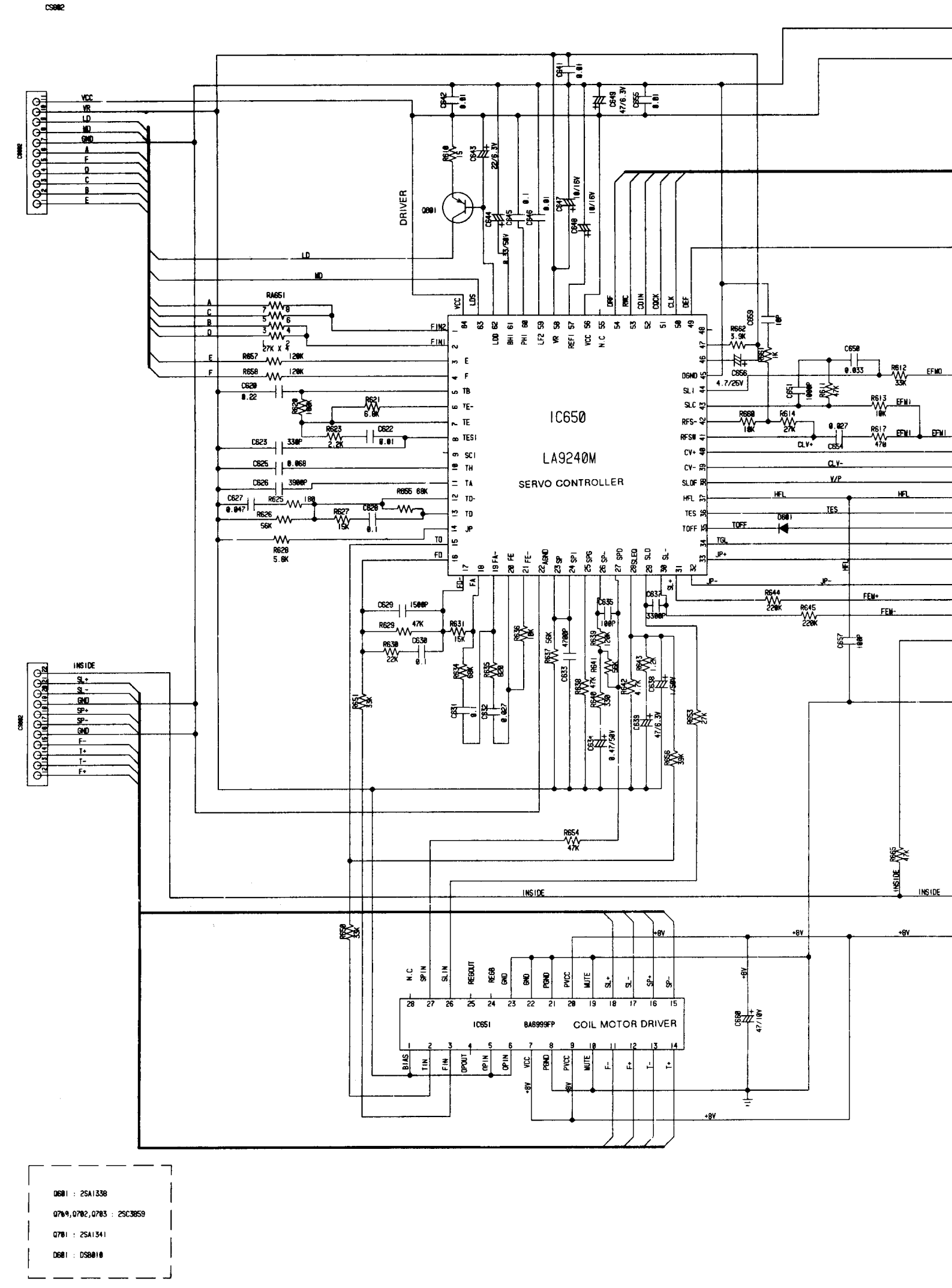
Note: DIN connections shown here from the REAR side of the connector.

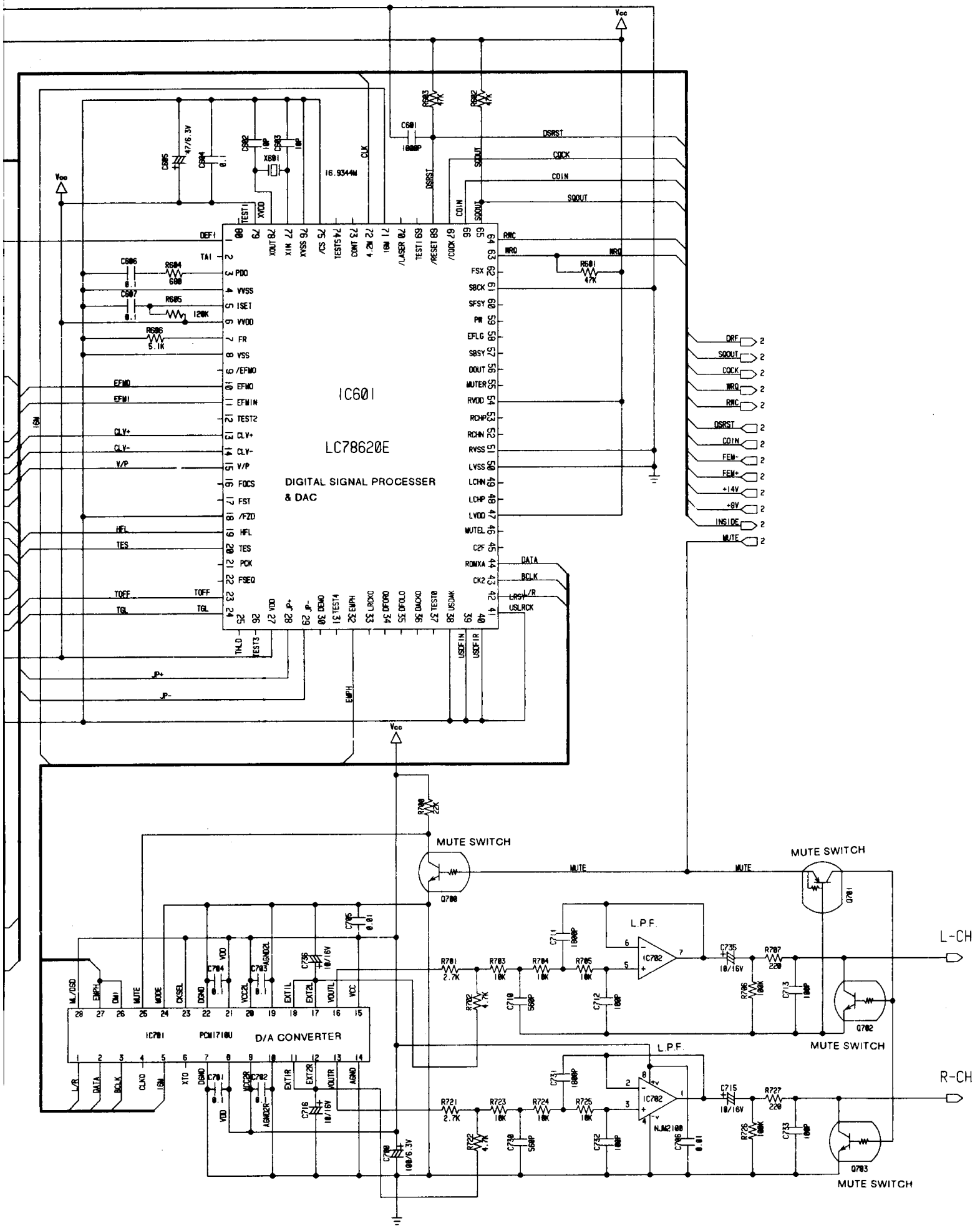


8PIN DIN	13PIN DIN
1	7
2	8
3	5
4	12
5	11
6	4
7	2
8	1,3
SHIELD	9, SHIELD

CABLE CONNECTION

CIRCUIT DIAGRAM 1/3




IC601
LC78620E
DIGITAL SIGNAL PROCESSER
& DAC
MUTE SWITCH
MUTE SWITCH
MUTE SWITCH
MUTE SWITCH
L.P.F.
L.P.F.
D/A CONVERTER
L-CH
R-CH
Vcc
DSRST
CQCK
CQIN
SQOUT
MRQ
RWC
DATA
BCLK
L/R
USLRCK
MUTE
JP+
JP-
TOFF
TGL
HFL
TES
EFMO
EFMI
CLV+
CLV-
V/P
/FZD
FOCS
FST
PCK
FSEQ
DRF
FEM-
FEM+
+14V
+8V
INSIDE

VOLTAGE MEASUREMENT TABLES

(Note: all voltages given in these tables are average DC values, unless otherwise noted)

IC601 - LC78620E

1:	0V
2:	N.C.
3:	3.0V
4:	0V
5:	1.8V
6:	5.0V
7:	1.5V
8:	0V
9:	N.C.
10:	5.0V PULSE
11:	2.5V
12:	N.C.
13:	5.0V PULSE
14:	0V
15:	0V
16:	N.C.
17:	N.C.
18-20:	0V
21:	N.C.
22:	N.C.
23:	0V
24:	5.0V
25:	N.C.
26:	N.C.
27:	5.0V
28:	0V
29:	0V
30-37:	N.C.
38-41:	0V
42-46:	N.C.
47:	5.0V
48:	5.0V PULSE
49:	5.0V PULSE
50:	0V
51:	0V
52:	5.0V PULSE
53:	5.0V PULSE
54:	5.0V
55-60:	N.C.
61:	0V
62:	N.C.
63-65:	5.0V PULSE
66:	5.0V
67:	5.0V CLOCK
68:	5.0V
69-71:	N.C.
72:	5.0V CLOCK
73:	N.C.
74:	N.C.
75:	0V
76:	0V
77:	4.2V
78:	5.0V CLOCK
79:	5.0V
80:	N.C.

IC650 - LA9240MS

1-21:	2.5V
22:	0V
23-31:	2.5V
32:	0V
33:	0V
34:	5.0V
35:	0V
36:	5.0V PULSE
37-39:	0V
40:	5.0V PULSE
41:	3.0V PULSE
42-44:	2.5V
45:	0V
46-48:	N.C.
49:	0V
50:	5.0V CLOCK
51:	5.0V CLOCK
52:	5.0V
53:	0V
54:	5.0V
55:	N.C.
56:	5.0V
57-60:	2.5V
61:	2.0V
62:	3.8V
63:	0.2V
64:	5.0V

IC651 - BA6999FP

1-3:	2.5V
4:	N.C.
5:	2.5V
6:	2.5V
7:	8.0V
8:	0V
9:	8.0V
10:	0V
11:	0.5V
12-14:	0V
15:	2.0V PULSE
16-19:	0V
20:	8.0V
21-23:	0V
24:	N.C.
25:	N.C.
26:	2.5V
27:	2.5V
28:	N.C.

IC701 - PCM1710U

1-6:	5.0V CLOCK
7:	0V
8:	5.0V
9:	5.0V
10:	0V
11-13:	2.5V
14:	0V
15:	5.0V
16:	2.5V
17:	2.5V
18:	0V
19:	0V
20:	5.0V
21:	5.0V
22:	0V
23:	5.0V
24:	0V
25:	5.0V
26:	0V
27:	0V
28:	5.0V

IC702 - NJM2100M

1-3:	2.5V
4:	0V
5-7:	2.5V
8:	5.0V

Q601 - 2SA1338-6

B:	3.5V
C:	2.0V
E:	4.0V

Q700 - DTC114TK

B:	0V
C:	5.0V
E:	0V

Q701 - UN2113

B:	0V
C:	0V
E:	0V

Q702 - DTC114TK

B:	0V
C:	0V
E:	0V

Q703 - DTC114TK

B:	0V
C:	0V
E:	0V

VOLTAGE MEASUREMENT TABLES

(Note: all voltages given in these tables are average DC values, unless otherwise noted)

IC501 - MC147805AUT

1:	0.5V
2:	12.0V
3:	5.5V

IC551 - L78M05T

1:	8.0V
2:	0V
3:	5.0V

IC801 - LC66566B

1:	5.0V
2:	5.0V
3:	0V
4:	5.0V
5-9:	0V
10:	5.0V
11:	5.0V
12:	0V
13:	5.0V
14:	0V
15:	5.0V
16-20:	0V
21:	5.0V
22:	0V
23:	0V
24:	5.0V CLOCK
25:	5.0V CLOCK
26-30:	5.0V
31-39:	0V
40:	1.8V
41:	2.0V
42:	4.0V
43:	4.0V
44:	5.0V
45:	0V
46:	0V
47:	5.0V
48:	5.0V
49-51:	0V
52-55:	5.0V
56:	5.0V
57:	5.0V PULSE
58:	5.0V
59:	5.0V CLOCK
60:	5.0V PULSE
61-63:	0V
64:	5.0V

IC802 - S-8054HN

1:	5.0V
2:	8.0V
3:	0V

IC803 - PST9138N

1:	N.C.
2:	0V
3:	0V
4:	5.0V
5:	5.0V

IC804 - TC7SU04F

1:	0V
2:	4.5V
3:	0V
4:	0V
5:	5.0V

IC805 - TC7SU04F

1-3:	0V
4:	5.0V
5:	5.0V

IC806 - TC4S71F

1:	5.0V
2:	5.0V
3:	0V
4:	5.0V
5:	5.0V

IC850 - LB1644

1:	12.0V
2-8:	0V
9:	12.0V
10-16:	0V

IC851 - MSM6307GS

1-3:	5.0V PULSE
4:	0V
5:	5.0V PULSE
6:	5.0V PULSE
7:	0V
8:	5.0V PULSE
9:	5.0V PULSE
10-16:	0V
17:	5.0V
18:	0V
19;	2.5V
20:	2.5V
21:	5.0V
22:	5.0V PULSE
23:	5.0V
24:	5.0V CLOCK
25:	5.0V CLOCK
26:	5.0V
27:	5.0V PULSE
28:	0V
29-32:	5.0V PULSE

Q510 - 2SC2812

B:	5.5V
C:	12.0V
E:	5.0V

Q550 - 2SD2199S

B:	8.6V
C:	12.0V
E:	8.0V

Q803 - DTC124XK

B:	4.0V
C:	0V
E:	0V

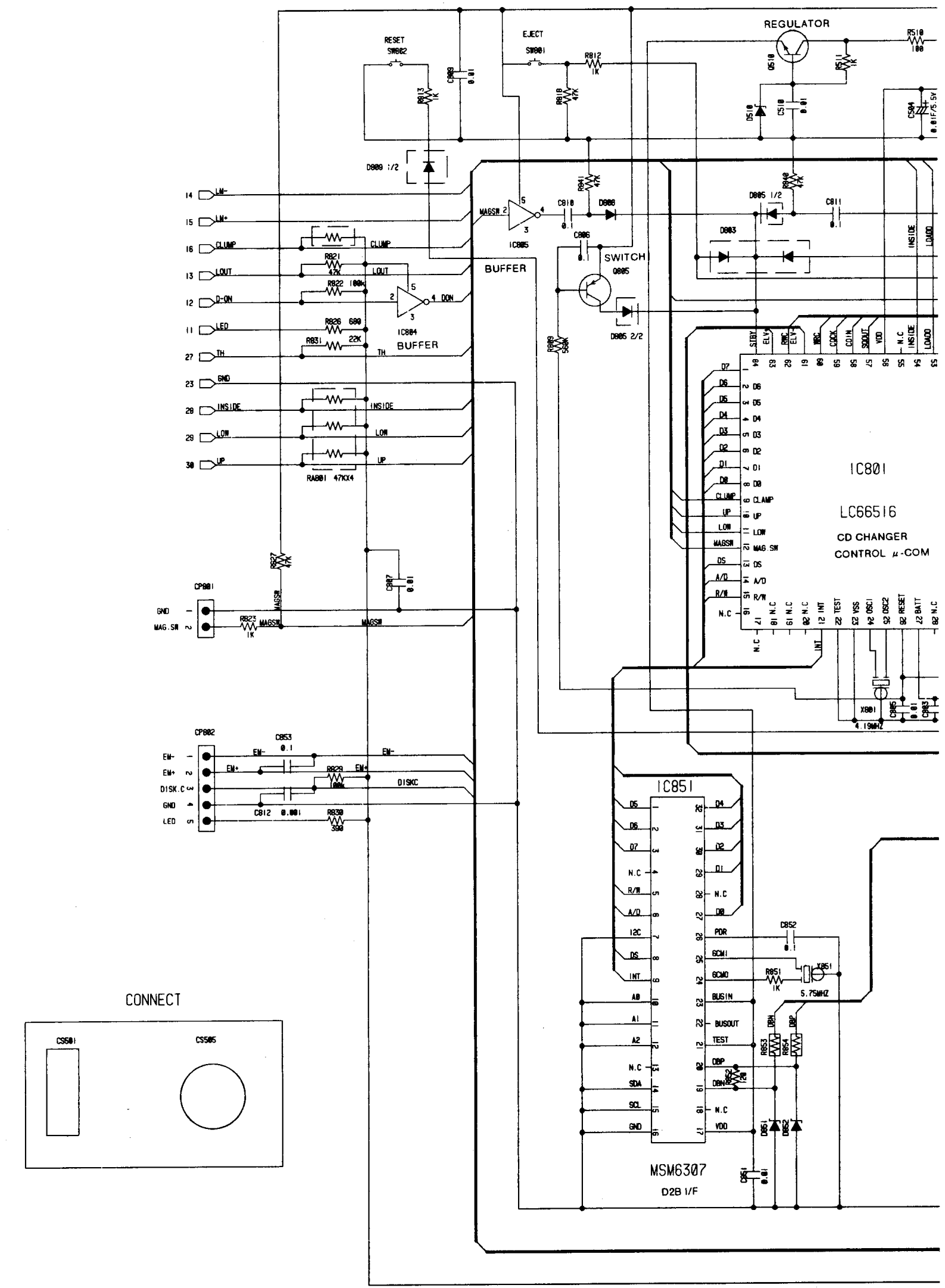
Q804 - 2SB1202

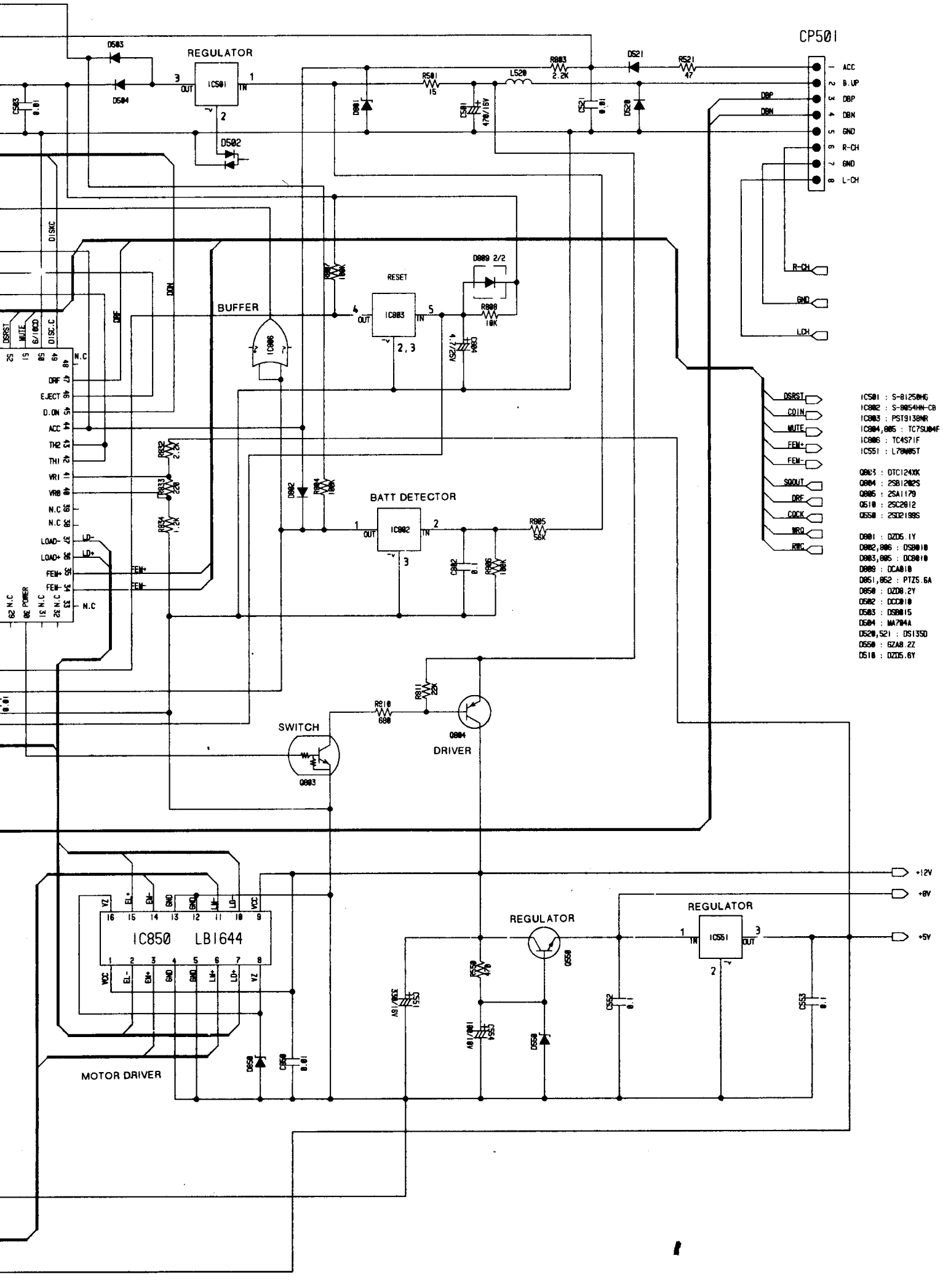
B:	11.0V
C:	12.0V
E:	12.0V

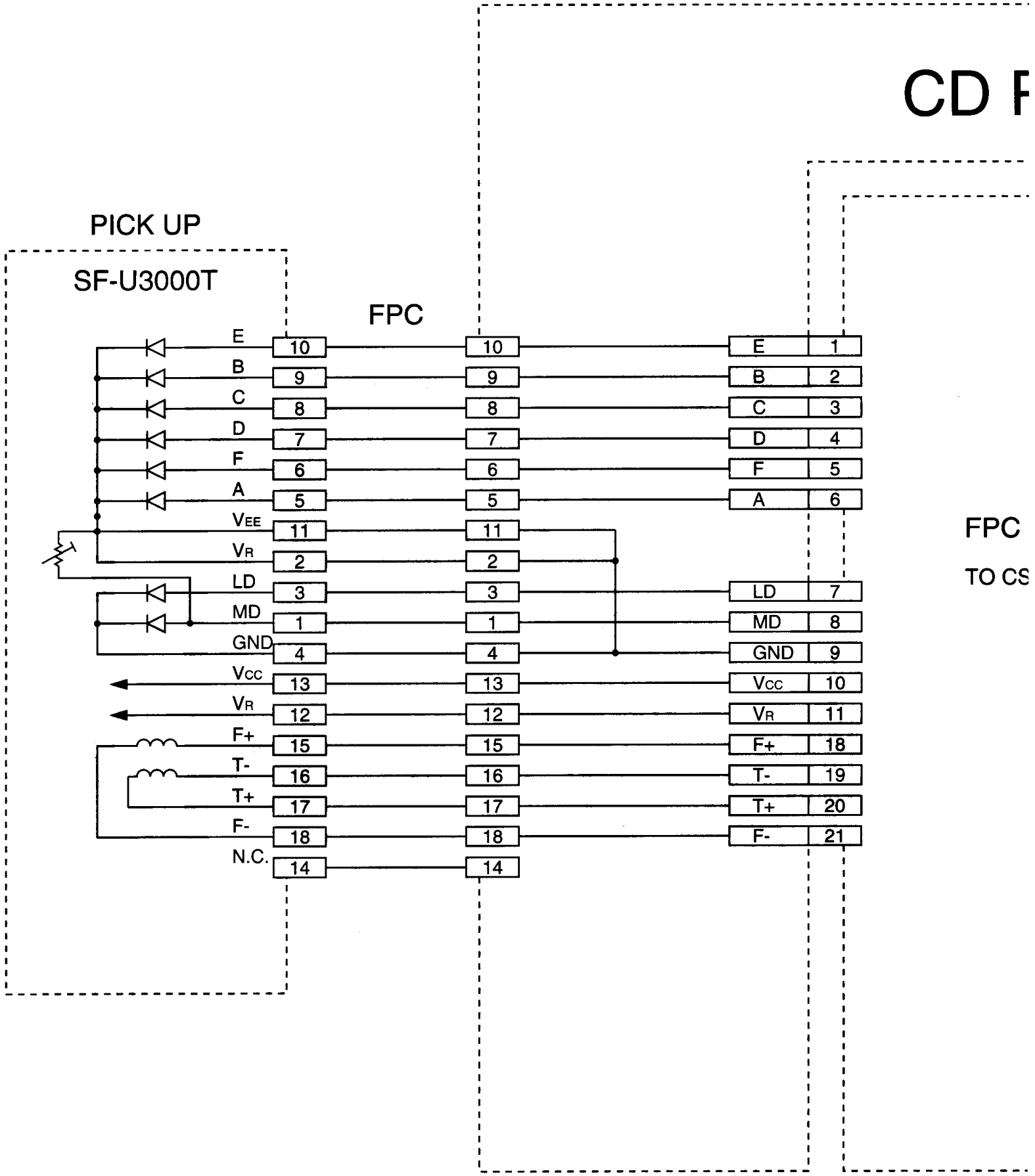
Q805 - 2SA1179

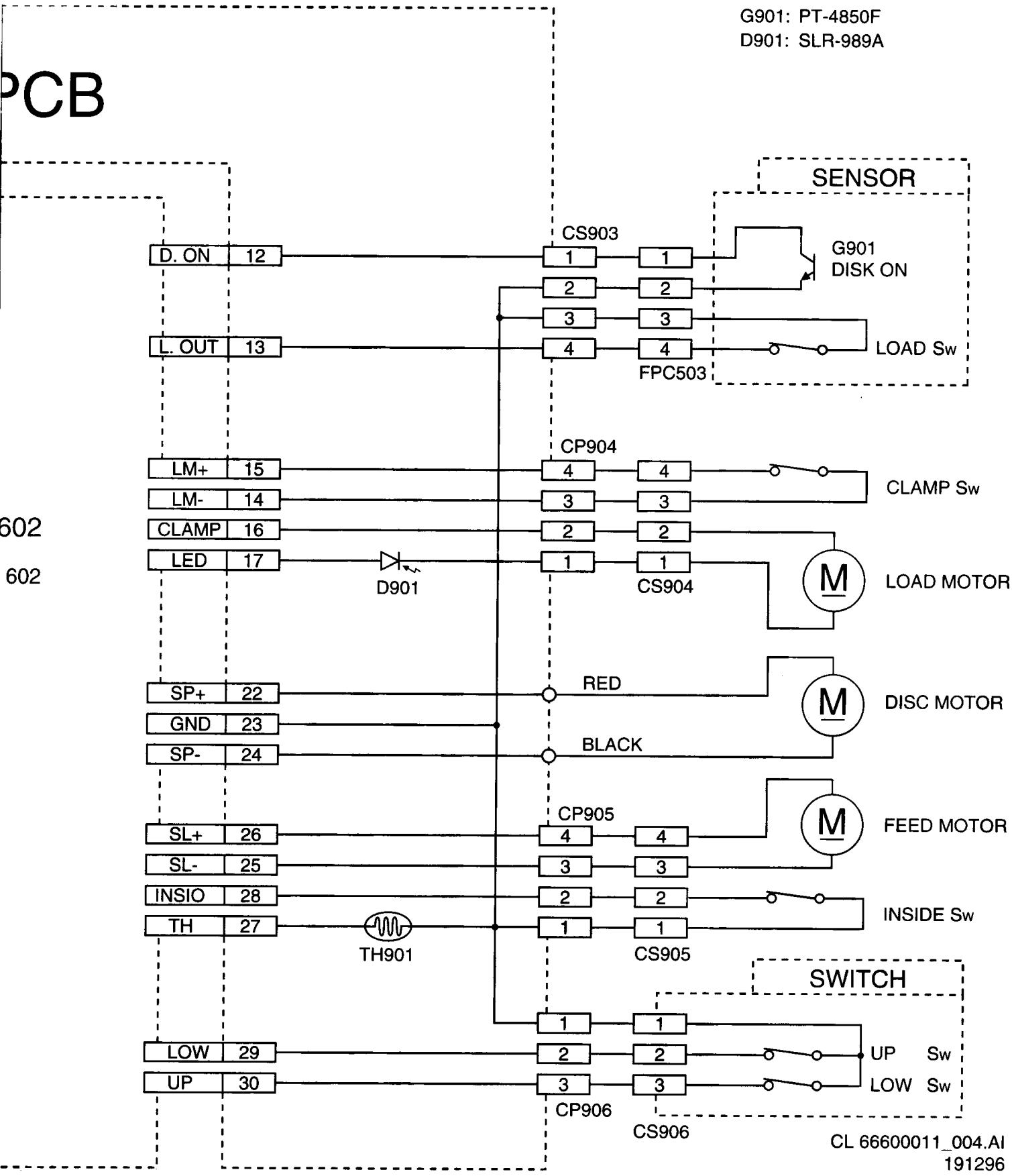
B:	5.0V
C:	0V
E:	5.0V

CIRCUIT DIAGRAM 2/3



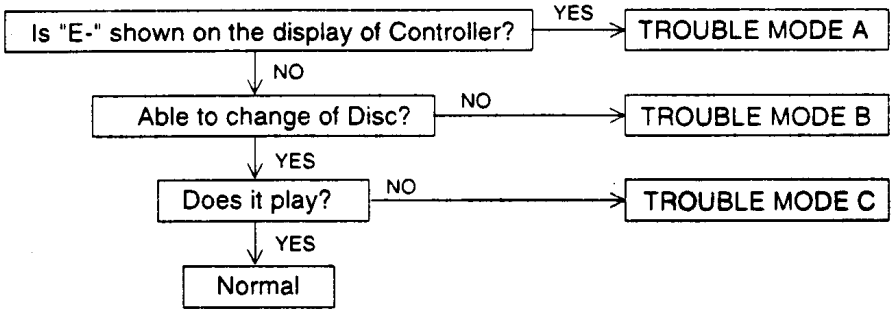

CP501
REGULATOR
IC501
BUFFER
IC806
RESET
IC803
BATT DETECTOR
IC802
SWITCH
Q803
DRIVER
Q804
IC850 LB1644
MOTOR DRIVER
REGULATOR
IC551
REGULATOR
Q550
ACC
B.UP
DBP
DBN
GND
R-CH
GND
L-CH
DSRST
COIN
MUTE
FEM+
FEM-
SQOUT
DRF
COCK
MRQ
RMC
+12V
+8V
+5V
IC501 : S-81250HG
IC802 : S-8054HN-CB
IC803 : PST9138NR
IC804,805 : TC7SU04F
IC806 : TC4S71F
IC551 : L78M05T
Q803 : DTC124XK
Q804 : 2SB1202S
Q805 : 2SA1179
Q510 : 2SC2812
Q550 : 2SD2199S
D501 : DZ05.1Y
D802,806 : DSB010
D803,805 : DCB010
D809 : DCA010
D851,852 : PTZ5.6A
D850 : DZ08.2Y
D502 : DCC010
D503 : DSB015
D504 : MA704A
D520,521 : DSI35D
D550 : SZA8.2Z
D510 : DZ05.6Y


CD F
PICK UP
SF-U3000T
FPC
FPC
TO CS
E
B
C
D
F
A
VEE
VR
LD
MD
GND
Vcc
VR
F+
T-
T+
F-
N.C.
10
9
8
7
6
5
11
2
3
1
4
13
12
15
16
17
18
14
10
9
8
7
6
5
11
2
3
1
4
13
12
15
16
17
18
14
E 1
B 2
C 3
D 4
F 5
A 6
LD 7
MD 8
GND 9
Vcc 10
VR 11
F+ 18
T- 19
T+ 20
F- 21


G901: PT-4850F
D901: SLR-989A
PCB
602
602
SENSOR
CS903
D. ON 12
L. OUT 13
1
2
3
4
G901
DISK ON
LOAD Sw
FPC503
CP904
LM+ 15
LM- 14
CLAMP 16
LED 17
CLAMP Sw
D901
CS904
LOAD MOTOR
SP+ 22
GND 23
SP- 24
RED
BLACK
DISC MOTOR
CP905
SL+ 26
SL- 25
INSIO 28
TH 27
FEED MOTOR
INSIDE Sw
TH901
CS905
SWITCH
LOW 29
UP 30
UP Sw
LOW Sw
CP906
CS906
CL 66600011_004.AI
191296

TROUBLE SHOOTING

TROUBLE CHECKING FLOW CHART



1. TROUBLE MODE A

"E" displayed by mechanical trouble of changer Mechanism. (At first, check voltage of car battery.)

E-07..... TOC Reading Defective
- Disc is reversed
- Disc is stained
- Chucking is imperfect
- Inner Circlelimit SW defective
- Feed Motor Mechanism defective
- P.U FPC Short has not removed

E-30.....Temperature Trouble Message
- The temperature inside the changer goes above its reference temperature.

2. TROUBLE MODE B

(Disc change is not completed within 30 seconds.)
- Mechanism defective
- Magazine defective
- LOAD SW, UP SW, LOW SW, CLAMP SW, MAG SW defective.
- Q901, D901, D910 defective

3. TROUBLE MODE C

SYMPTOM	DEFECTIVE CIRCUIT	DEFECTIVE POINT
Disc Turning	Inferiority Feed Motor Circuit	· Check inner circlelimit SW and CS602 28pin
		· Check voltage of IC801
		· Check voltage of IC651 17, 18pin
		· Check Feed Motor and Mechanism
	Focus Search Circuit	· Check voltage of IC650 16pin
		· Check voltage of IC651 11, 12pin
		· Check CS602 18, 21pin
		· Check pickup
	APC	· Check Q601 short or open
		· Check IC601 62,63pin
		· Check pickup
	Disc Motor Circuit	· Check IC601 13pin and IC650 27pin
		· Check IC651 15, 16pin
		· Check Disc Motor and Mechanism
	Power Supply Circuit	· Check IC801 11,13pin
		· Check Q803, Q804
		· Check Q550 and IC551
Track Search	Tracking Servo Circuit	· Check voltage of TP. TE and adjustment Inferiority of SVR651
		· Check IC650 15pin and IC651 13,14pin
		· Check IC651 3, 4pin
		· Check pickup
	Kick Pulse Circuit	· Check IC601 28, 29pin and IC650 14pin
	Feed Motor Circuit	· Check IC650 29pin
		· Check Feed Motor and Mechanism
Noise	RF Circuit	· Check waveform of TP RF
	Mechanism	· Check eccentricity of Mechanism and Disc rub
	Audio Circuit	· Check IC701,702
		· Check Q700~703
		· Check CP501 6, 7, 8pin

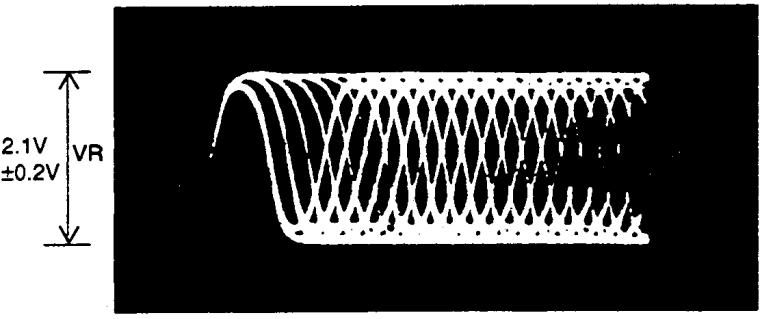
TROUBLE SHOOTING

WAVE FORM

Note: Reference voltage VR → TP, VR (2.50)

MODE PLAY

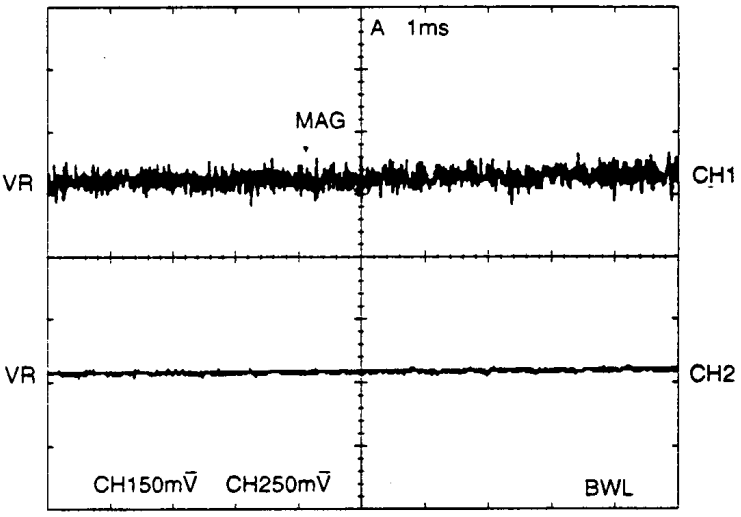
RF (TP, RF) 0.5µs



MODE PLAY

CH1 TE (TP,TE)

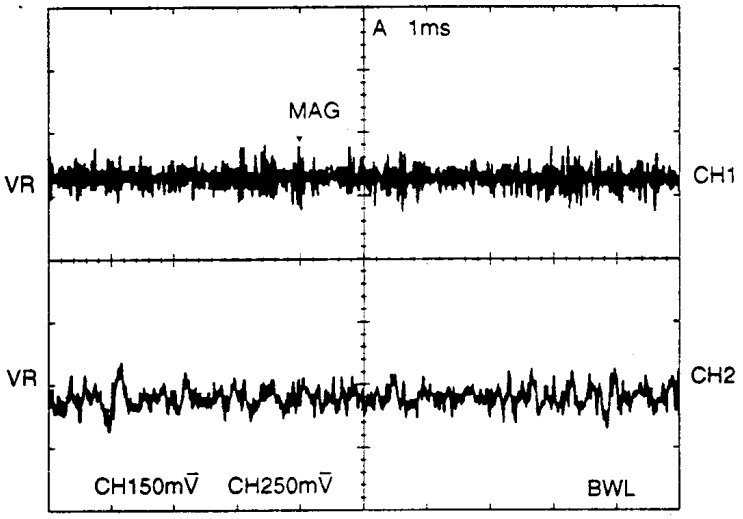
CH2 FE (TP,FE)



MODE PLAY

CH1 TO (IC650 15PIN)

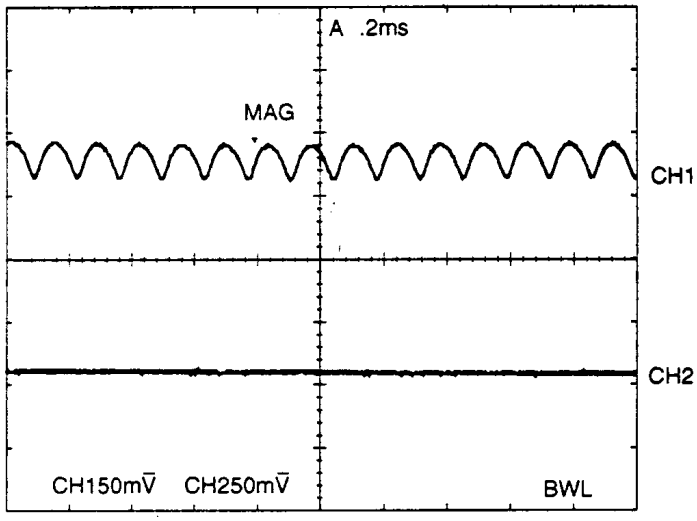
CH2 FD (IC650 16PIN)



MODE PLAY

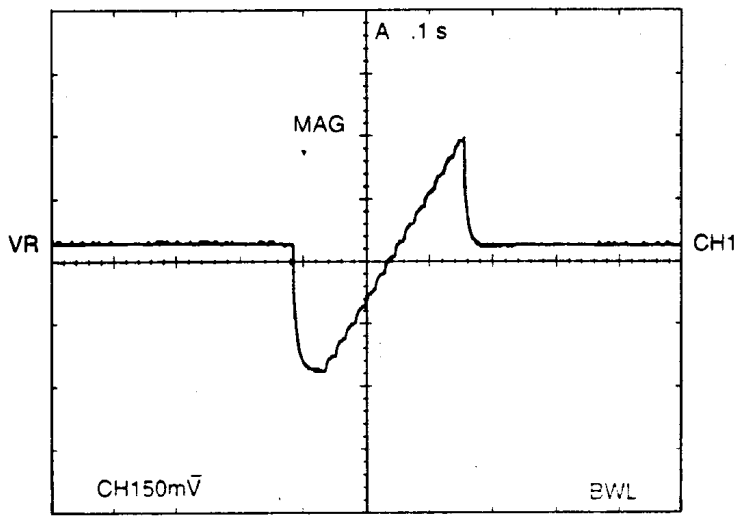
CH1 SPD (IC650 27PIN)

CH2 SLEQ (IC650 28PIN)



MODE FOCUS SEARCH

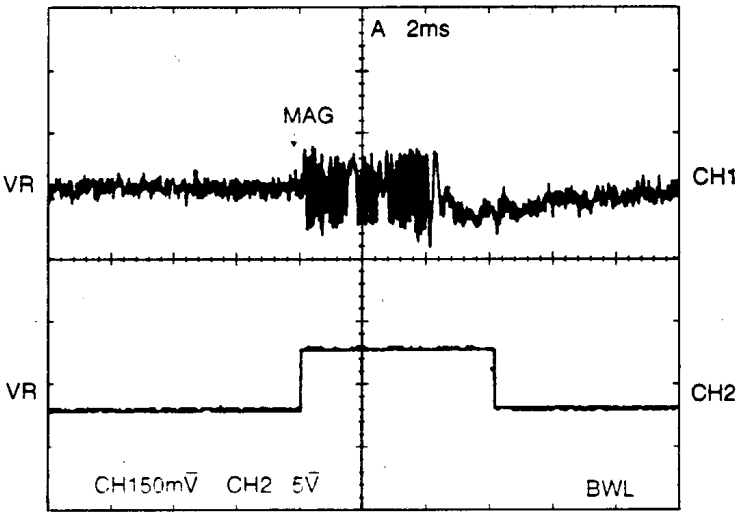
CH1 FD (IC650 16PIN)



MODE Forward Search (64 Track jump)

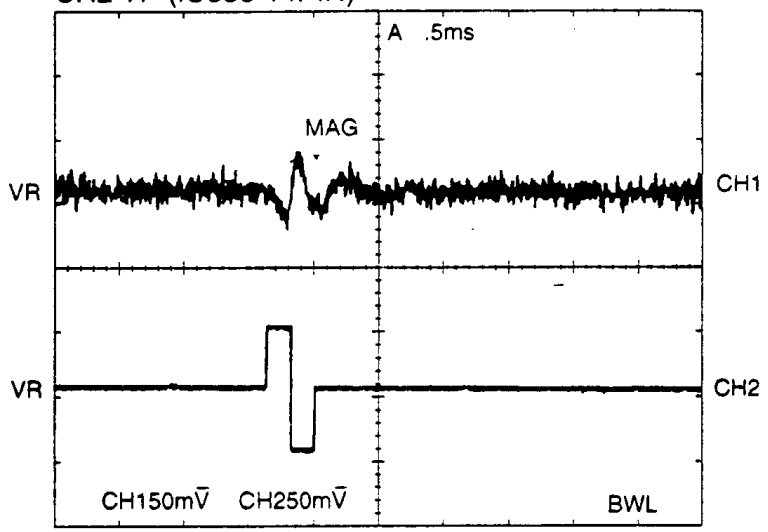
CH1 TE (TP, TE)

CH2 FEM+ (IC801 1PIN)

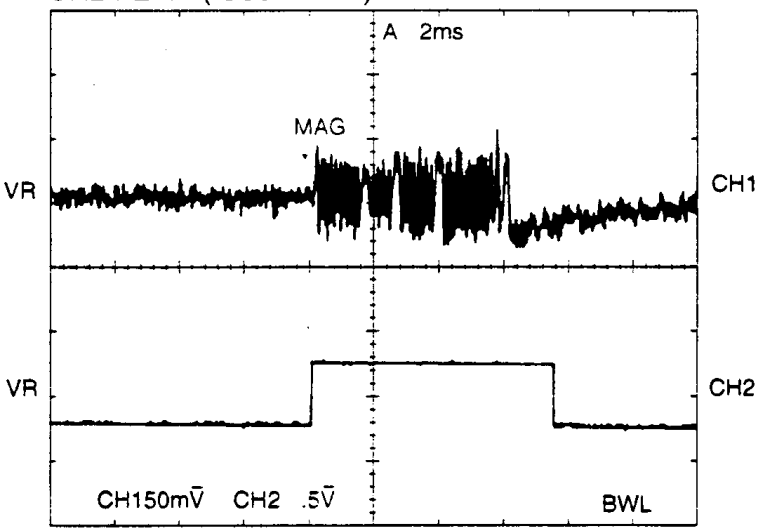


PCS 82 462

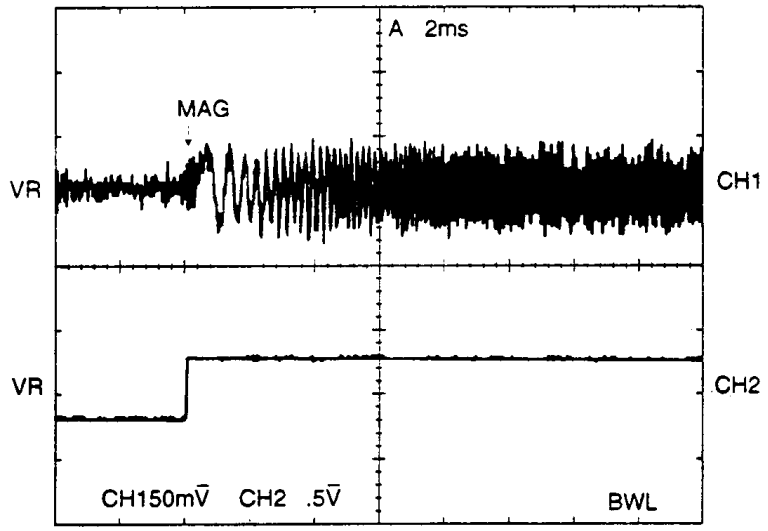
MODE PAUSE
CH1 TE (TP, TE)
CH2 TP (IC650 14PIN)



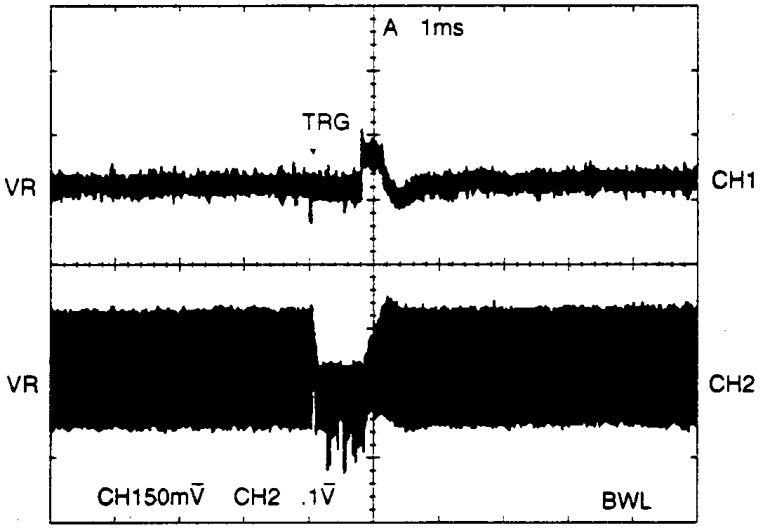
MODE Forward Search (128 Track jump)
CH1 TE (TP, TE)
CH2 FEM+ (IC801 1PIN)



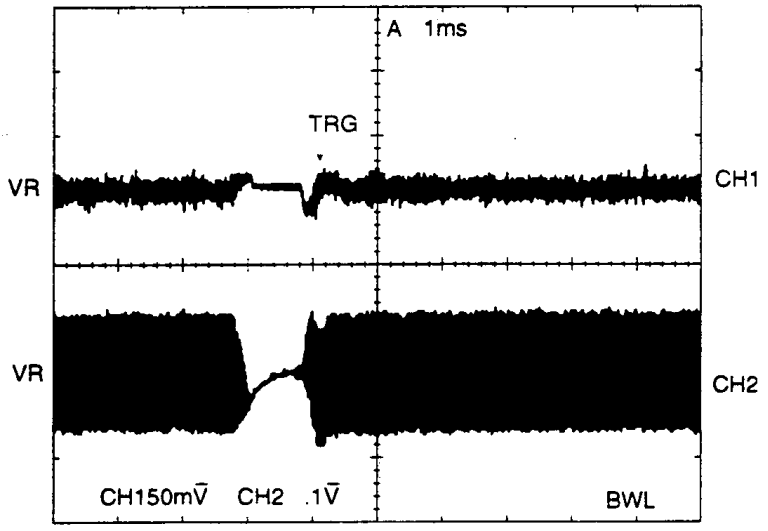
MODE Forward Search (Track count)
CH1 TE (TP, TE)
CH2 FEM+ (IC801 1PIN)

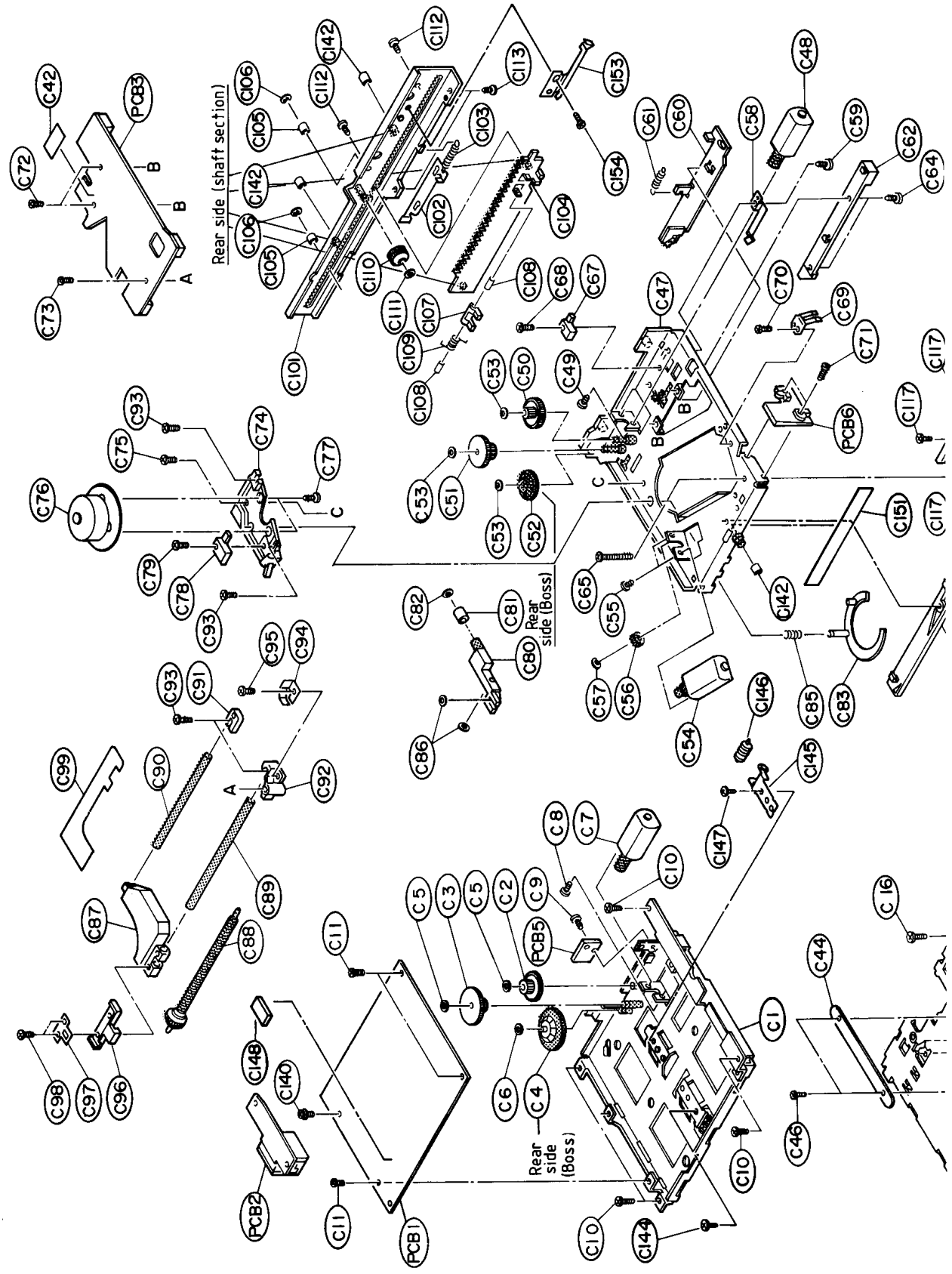


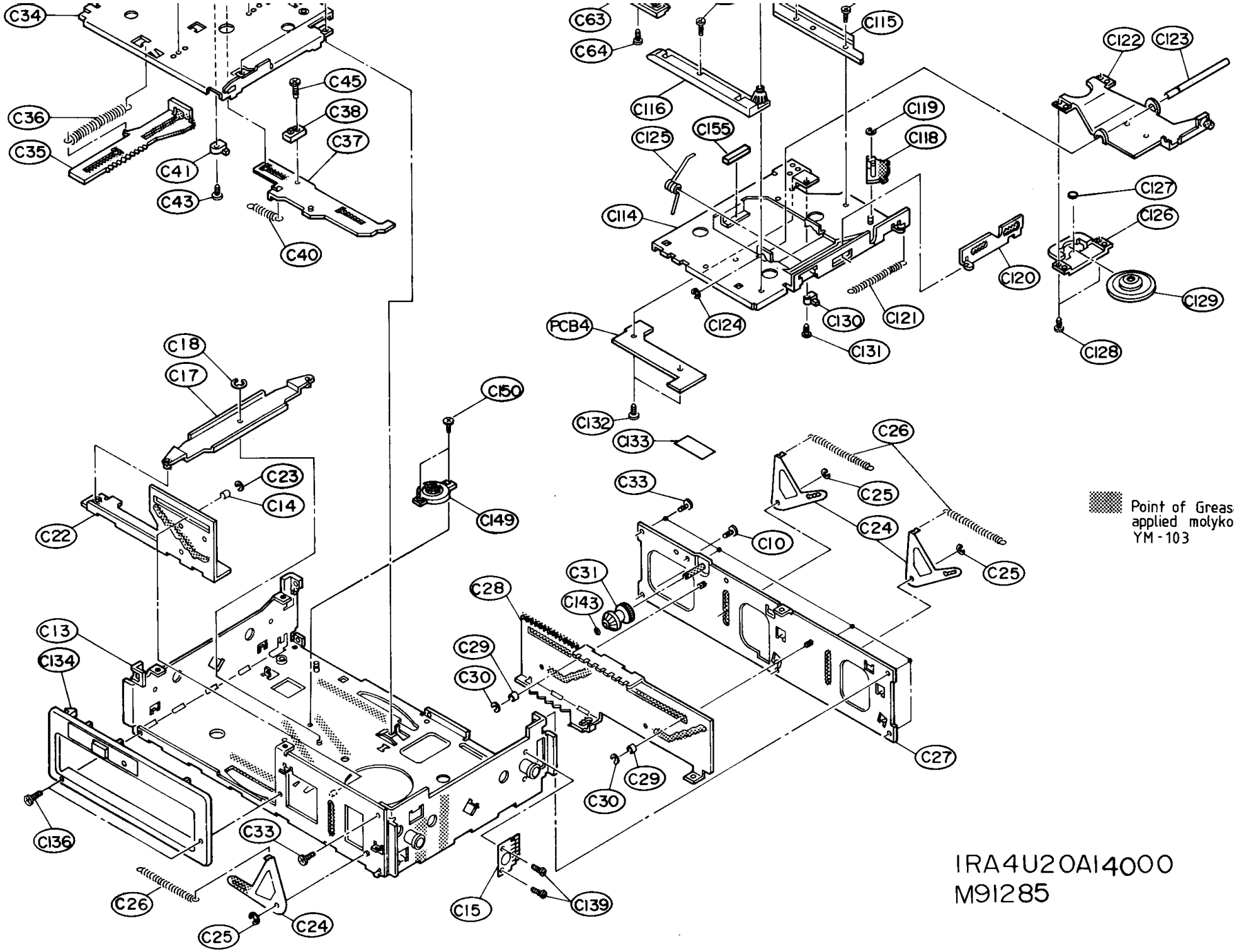
MODE PLAY (The interruption part passes 1mm)
CH1 TE (TP, TE)
CH2 RF (TP, RF)



MODE PLAY (The black dots part passes 1mm)
CH1 TE (TP, TE)
CH2 RF (TP, RF)



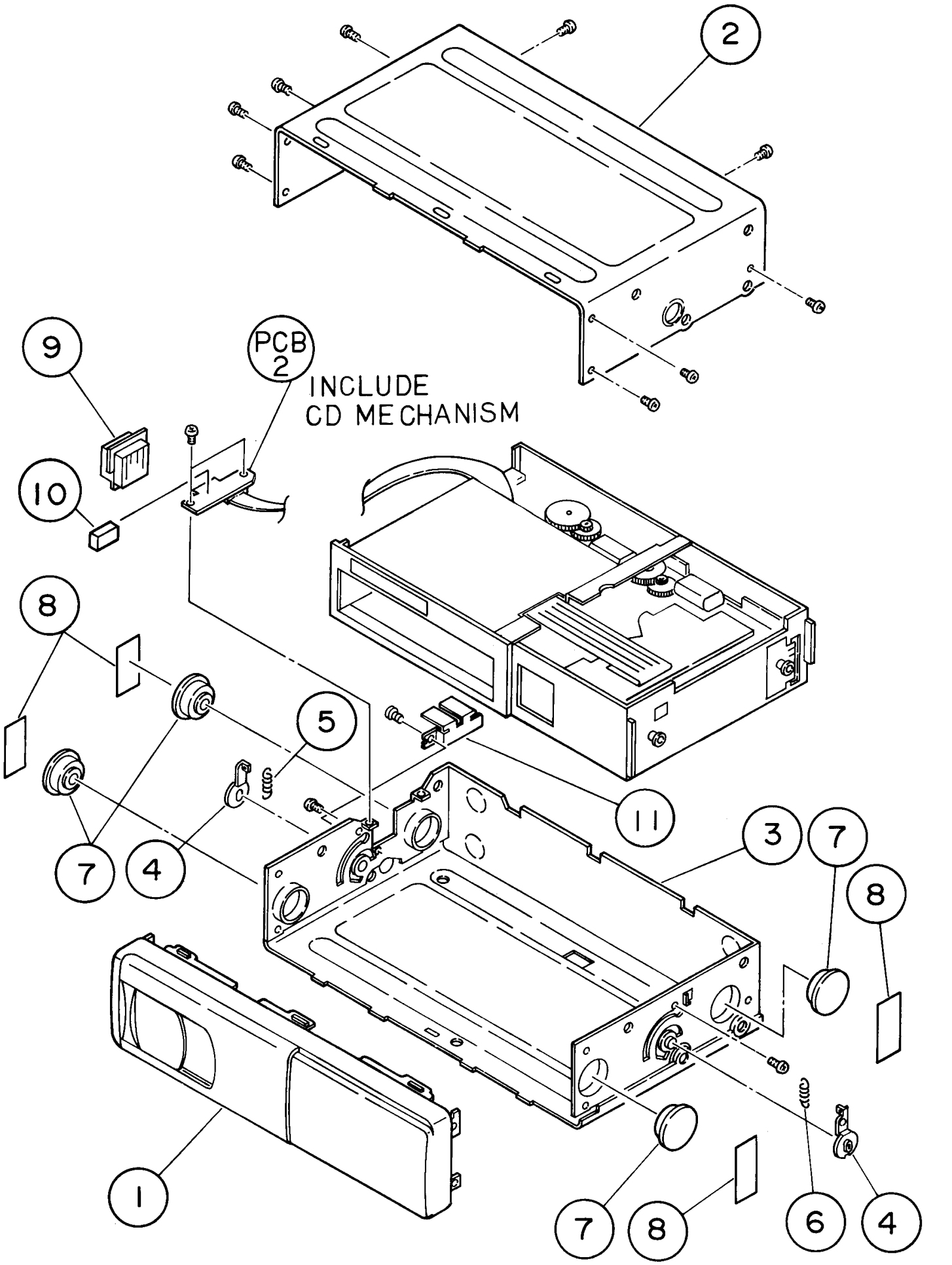

Rear side (shaft section)
Rear side (Boss)
Rear side (Boss)


C34
C36
C35
C45
C38
C37
C41
C43
C40
C63
C64
C115
C116
C119
C118
C125
C155
C114
C120
C122
C123
C127
C126
C129
C124
C130
C121
C131
C128
PCB4
C132
C133
C18
C17
C150
C23
C14
C22
C149
C26
C25
C24
C33
C10
C31
C143
C28
C29
C30
C27
C13
C134
C136
C33
C26
C25
C24
C15
C139
Point of Greas
applied molyko
YM-103
IRA4U20A14000
M91285

MECHANICAL PARTS RC026

C2	4822 522 33508	Gear, A
C3	4822 522 33509	Gear, B
C4	4822 522 33511	Gear, C
C5	4822 532 12294	Special washer
C6	4822 532 12295	Special washer
C7	4822 361 30441	Assy DC motor
C23	4822 532 12293	Special washer
C30	4822 532 12293	Special washer
C31	4822 522 33512	Gear, D
C41	4822 276 13547	Switch, push
C48	4822 361 30441	Assy DC motor
C50	4822 522 10595	Gear, LA
C51	4822 522 10596	Gear, LB
C52	4822 522 33514	Gear, G
C53	4822 532 12294	Special washer
C54	4822 361 10935	Assy CD feed motor
C56	4822 522 10597	Gear, FB
C57	4822 532 12735	Special washer
C67	4822 276 13547	Switch, push
C76	4822 361 10936	Assy DC motor
C78	4822 276 13547	Switch, push
C82	4822 532 12294	Special washer
C86	4822 532 12295	Special washer
C87	4822 691 10567	Pickup unit
C91	4822 535 10449	Shaft
C92	4822 502 14399	Screw
C96	4822 463 11123	Thrust, screw
C102	4822 402 61548	Lever, switch
C104	4822 402 61549	Assy lever/slide
C106	4822 532 12293	Special washer
C110	4822 522 33515	Gear, H
C111	4822 532 12294	Special washer
C129	4822 528 11071	Flange
C130	4822 276 13547	Switch, push
C134	4822 459 04421	Panel assy
C143	4822 532 12295	Special washer
C145	4822 402 10626	Arm, roller
C146	4822 528 11069	Roller
	4822 321 62668	Cable, 2p - 160mm
	4822 320 11737	Cable, 4p - 40mm
	4822 320 11738	Cable, 5p - 90mm

Note: *all parts not mentioned here are no service parts!*



IRA4U29A33000
RC026

PCS 82 466

CABINET PARTS AND ACCESSORIES

Note: *all parts not mentioned here are no service parts!*

1	4822 459 04422	Front panel assy
2	4822 444 40787	Cabinet assy
3	4822 442 00686	Bottom lid assy
7	4822 529 10308	Damper
9	4822 462 10841	Cap for DIN connector
	4822 736 14834	Instructions for use
	4822 402 61551	Accessory part assy - brackets
	4822 310 10777	Accessory part assy - car fixation brackets
	4822 310 10778	Accessory part assy - brackets and bolts
	4822 321 62671	DIN extension cable 5.5m
	4822 321 62263	Rect.C - DIN interface cable
	4822 691 10569	CD magazine assy
	4822 502 21556	Transport screw

ELECTRICAL PARTS RC026

Note: *all parts not mentioned here are no service parts!*

D502	4822 130 82557	DCC010
D503	4822 130 10782	DSB015
D504	4822 130 83633	MA704A
D510	4822 130 83765	Zener 5.6V
D520	4822 130 31533	DS135
D521	4822 130 31533	DS135
D550	4822 130 10783	Zener 8.2V
D601	4822 130 83631	DSB010
D801	4822 130 83632	Zener 5.1V
D802	4822 130 83631	DSB010
D803	4822 130 83637	DCB010
D805	4822 130 83637	DCB010
D806	4822 130 83631	DSB010
D809	4822 130 10784	DCA010
D850	4822 130 80273	Zener 8.2V
D851	4822 130 10657	Zener 5.6V
D852	4822 130 10657	Zener 5.6V
D901	4822 130 10114	LED SLR-989A-AB
D910	4822 130 91369	Photo coupler SPI-235-1
	4822 130 63655	Photo diode PT4850F

Q510	4822 130 60753	2SC2812-L6
Q550	4822 130 10786	2SD2199S-TSD-DR
Q601	4822 130 10787	2SA1338-6
Q700	4822 130 90323	DTC114TK
Q701	4822 111 90813	UN2113
Q702	4822 130 90323	DTC114TK
Q703	4822 130 90323	DTC114TK
Q803	4822 130 63551	DTC124XK
Q804	4822 130 62912	2SB1202(ST)
Q805	4822 130 10785	2SA1179-M6

IC501	4822 209 33241	MC147805AUT
IC551	4822 209 33094	L78M05T
IC601	4822 209 15225	LC78620E-D
IC650	4822 209 15227	LA9240M servo
IC651	4822 209 15228	BA6999FP
IC701	4822 209 15226	PCM1710U
IC702	4822 209 30455	NJM2100M
IC801	4822 209 15229	LC66566B-4H90
IC802	4822 209 63631	S-8054HN-CB
IC803	4822 209 15203	PST9138N
IC804	4822 209 32984	TC7SU04F
IC805	4822 209 32984	TC7SU04F
IC806	4822 209 72397	TC4S71F
IC850	4822 209 33758	LB1644
IC851	4822 209 32743	MSM6307GS

MISCELLANEOUS

CS505	4822 267 31758	DIN socket
L520	4822 157 11124	SK 5mH
SW801	4822 276 13828	Eject switch
SW802	4822 276 13548	Reset switch
TH901	4822 111 92201	Thermistor (NTH4G42B104EB)
X601	4822 242 81702	Crystal 16.9433MHz
X801	4822 242 73769	Ceramic resonator 4.190MHz
X851	4822 242 10678	Ceramic resonator 5.75MHz
	4822 276 13547	UP switch
	4822 276 13547	LOW switch